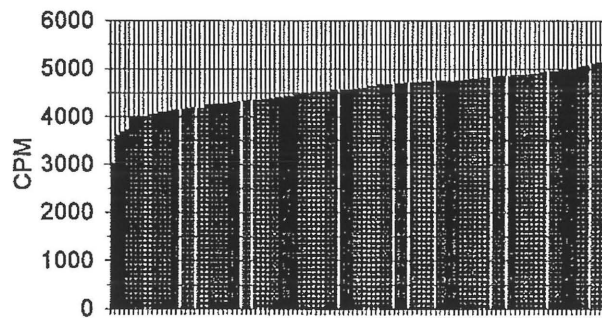


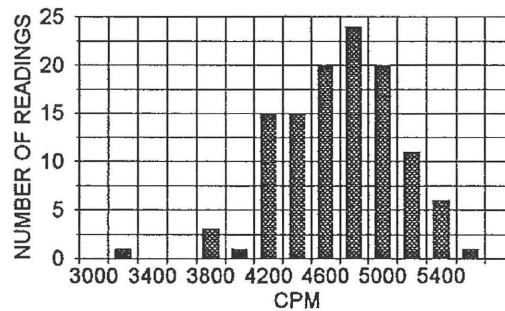
PHASE II - AREA H  
DRAINAGE/BOUNDARY (UNAFFECTED)  
GROSS GAMMA READINGS IN CPM  
LUDLUM MODEL 2221 S/N 48395 (SHIELDED)

SEPTEMBER 1998

SHIELDED "3" NaI DETECTOR READINGS  
SURVEY DATA



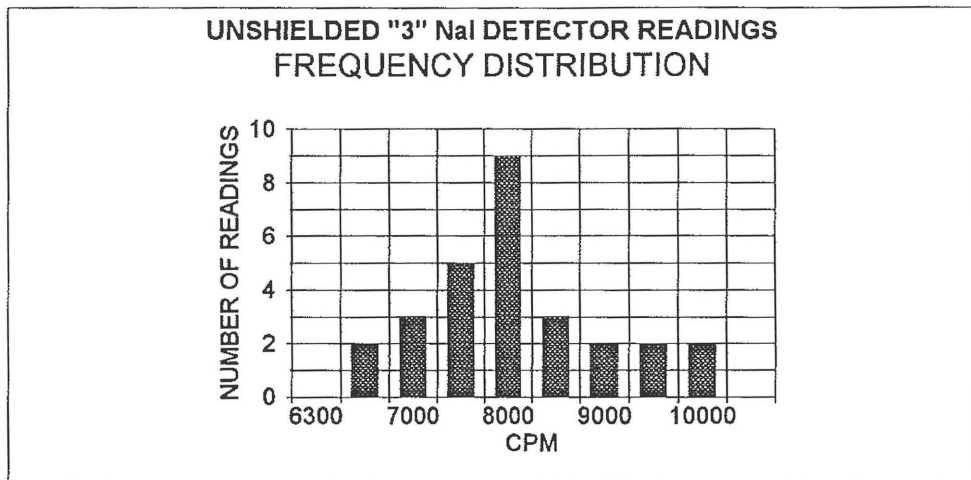
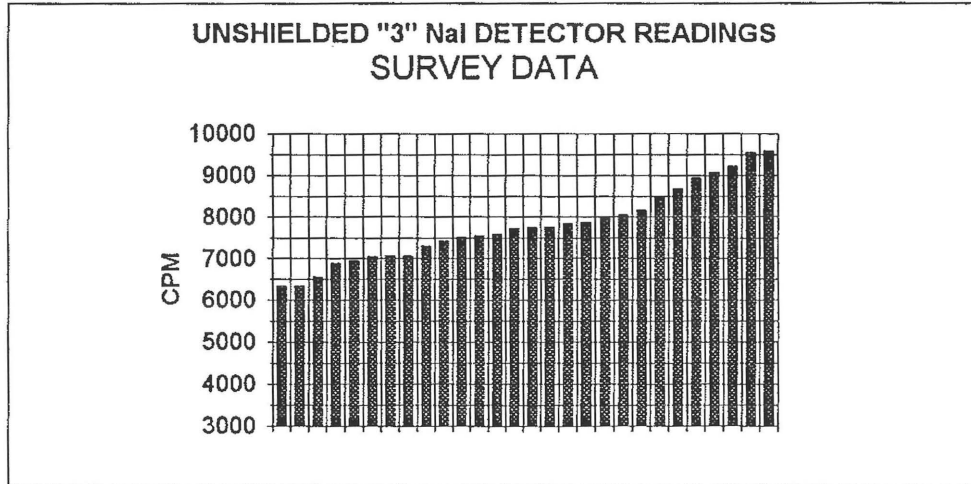
SHIELDED "3" NaI DETECTOR READINGS  
FREQUENCY DISTRIBUTION



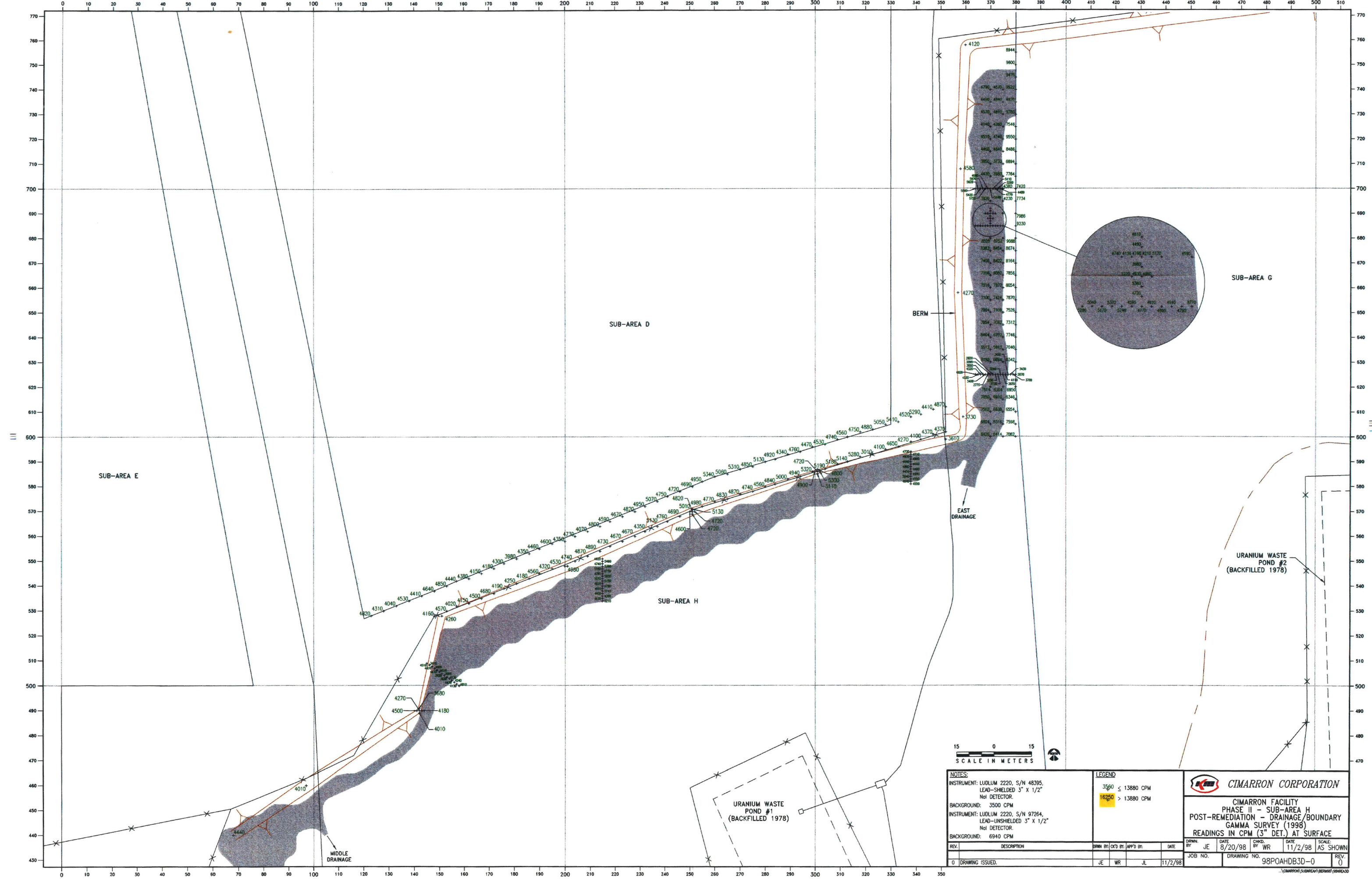
NUMBER OF SAMPLES	117
AVERAGE SAMPLE	4610
MINIMUM SAMPLE	3010
MAXIMUM SAMPLE	5410
STANDARD DEVIATION	406

PHASE II - AREA H  
DRAINAGE/BOUNDARY (UNAFFECTED)  
GROSS GAMMA READINGS IN CPM  
LUDLUM MODEL 2221 S/N 97264 (UNSHIELDED)

SEPTEMBER 1998




NUMBER OF SAMPLES	28
AVERAGE SAMPLE	7800
MINIMUM SAMPLE	6342
MAXIMUM SAMPLE	9600
STANDARD DEVIATION	894



15 0 15  
SCALE IN METERS

NOTES:  
INSTRUMENT: LUDLUM 2220, S/N 48395,  
LEAD-SHIELDED 3" X 1/2"  
NaI DETECTOR.  
BACKGROUND: 3500 CPM  
INSTRUMENT: LUDLUM 2220, S/N 97264,  
LEAD-UNSHIELDED 3" X 1/2"  
NaI DETECTOR.  
BACKGROUND: 6940 CPM

LEGEND			
3560	≤	13880	CPM
16250	>	13880	CPM

**CIMARRON CORPORATION**

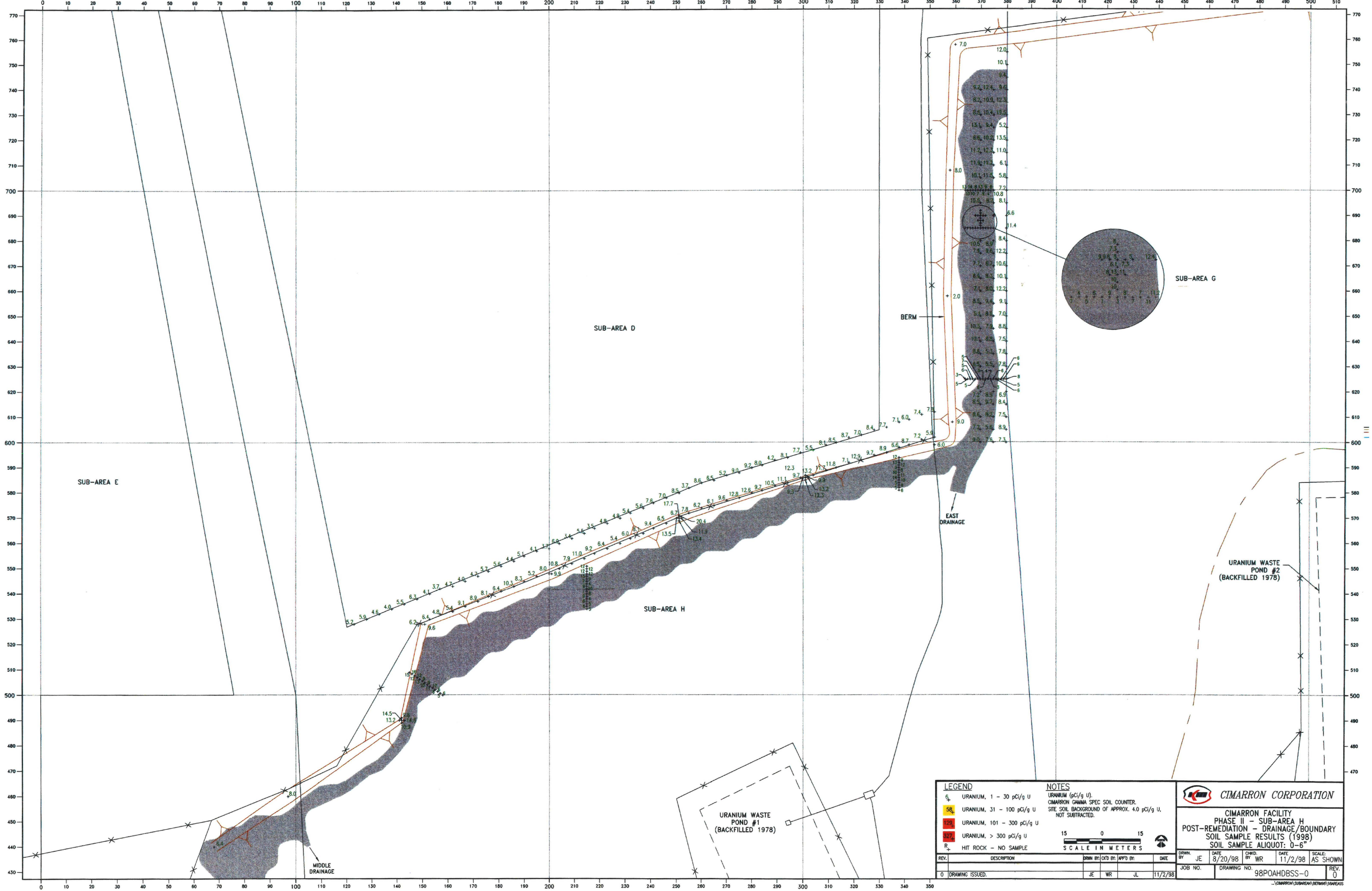
**CIMARRON FACILITY**  
**PHASE II - SUB-AREA H**  
**POST-REMEDATION - DRAINAGE/BOUNDARY**  
**GAMMA SURVEY (1998)**  
**READINGS IN CPM (3" DET.) AT SURFACE**

REV.	DESCRIPTION	DRAWN BY: JE	CHKD BY: WR	DATE: 8/20/98	DATE: 11/2/98	SCALE: AS SHOWN
0	DRAWING ISSUED.	JE	WR	JL	11/2/98	

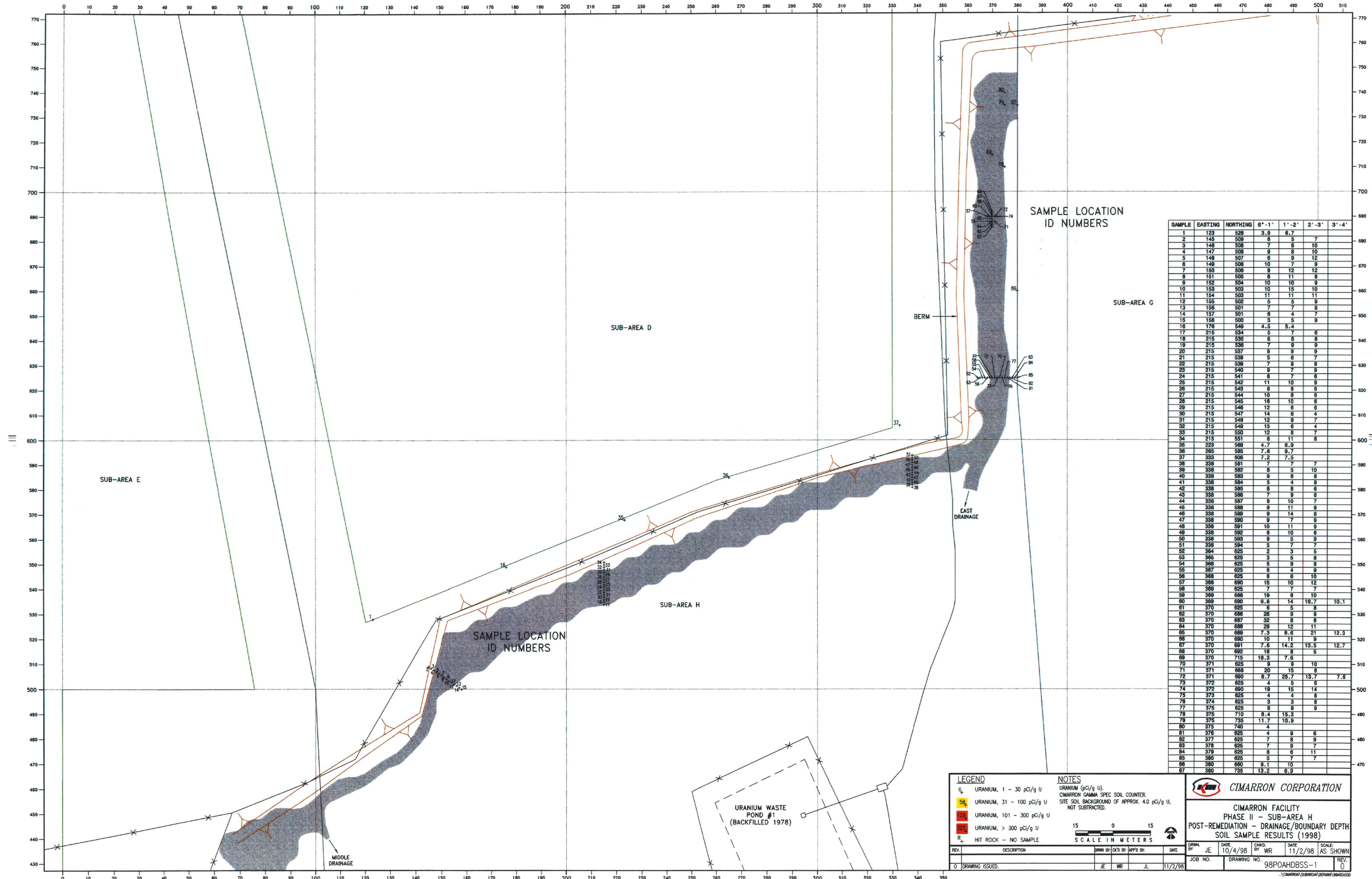
**JOB NO.** 98POAHDB3D-0  
**DRAWING NO.** 98POAHDB3D-0  
**REV.** 0

...CIMARRON, SUBAREA H, BERM, DRAINAGE









SAMPLE LOCATION  
ID NUMBERS

SUB-AREA G

SUB-AREA D

SUB-AREA E

SUB-AREA H

SAMPLE LOCATION  
ID NUMBERS

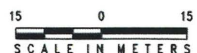
URANIUM WASTE  
POND #1  
(BACKFILLED 1978)

LEGEND

- 6<sub>u</sub> URANIUM, 1 - 30 pCi/g U
- 58<sub>u</sub> URANIUM, 31 - 100 pCi/g U
- 123<sub>u</sub> URANIUM, 101 - 300 pCi/g U
- 87<sub>u</sub> URANIUM, > 300 pCi/g U
- R<sub>+</sub> HIT ROCK - NO SAMPLE

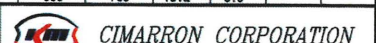
NOTES

URANIUM (pCi/g U).  
CIMARRON GAMMA SPEC SOIL COUNTER.  
SITE SOIL BACKGROUND OF APPROX. 4.0 pCi/g U,  
NOT SUBTRACTED.



SCALE IN METERS

REV.	DESCRIPTION	DATE	BY	CHK'D BY	DATE
0	DRAWING ISSUED.		JE	WR	JL 11/2/98

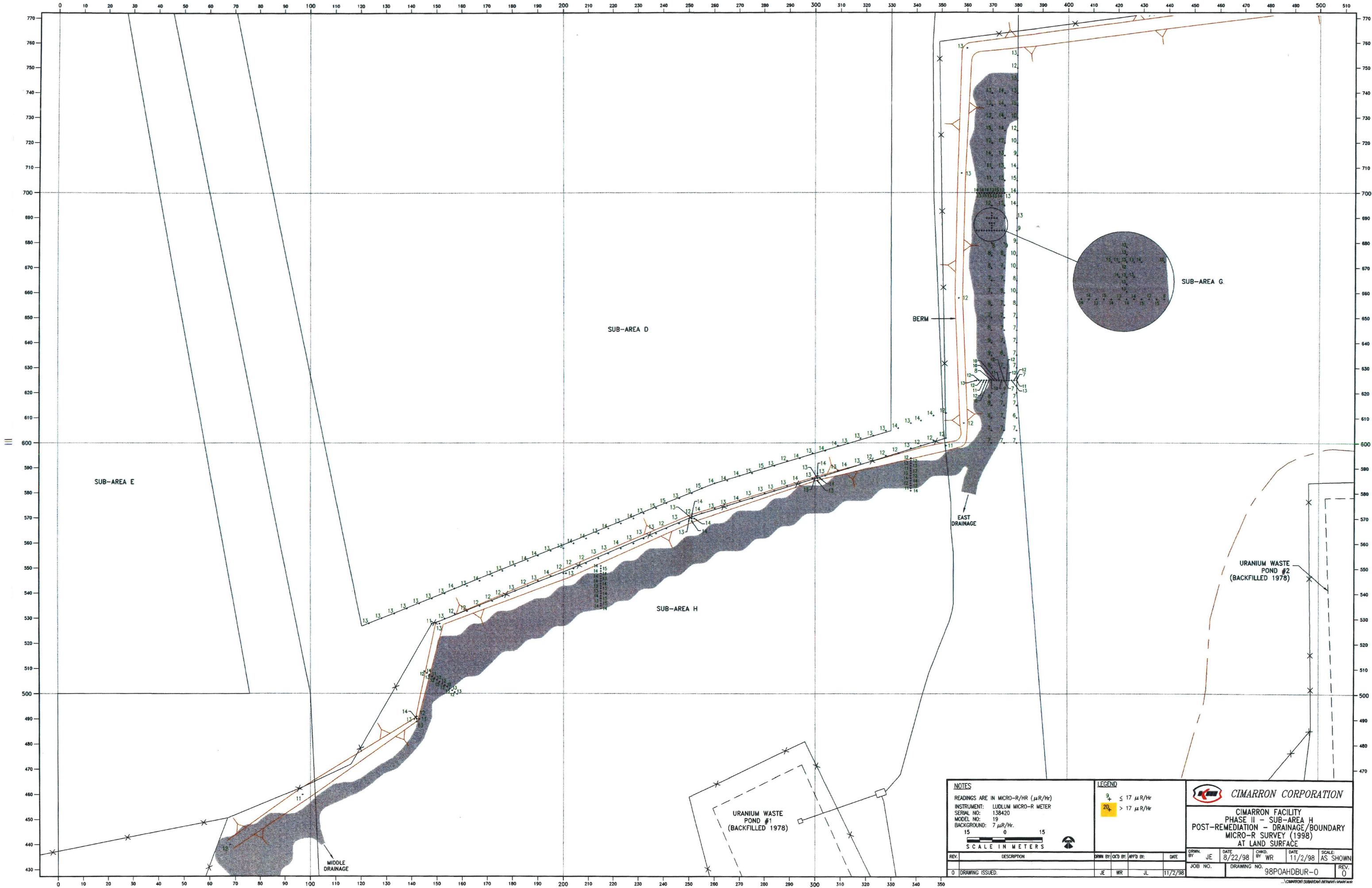


CIMARRON FACILITY  
PHASE II - SUB-AREA H  
POST-REMEDIATION - DRAINAGE/BOUNDARY DEPTH  
SOIL SAMPLE RESULTS (1998)

DRWN. BY: JE	DATE: 10/4/98	CHKD. BY: WR	DATE: 11/2/98	SCALE: AS SHOWN
JOB NO.	DRAWING NO. 98POAHDBSS-1	REV. 0		

SAMPLE	EASTING	NORTHING	6"-1'	1'-2'	2'-3'	3'-4'
1	123	528	3.9	6.7		
2	145	509	8	5	7	
3	148	508	7	8	10	
4	147	508	9	8	10	
5	148	507	8	9	12	
6	149	506	10	7	9	
7	150	506	9	12	12	
8	151	505	8	11	8	
9	152	504	10	10	9	
10	153	503	10	15	10	
11	154	503	11	11	11	
12	155	502	5	5	9	
13	156	501	7	7	8	
14	157	501	6	4	7	
15	158	500	3	5	9	
16	176	549	4.5	5.4		
17	215	534	5	7	6	
18	215	535	8	8	8	
19	215	536	7	9	9	
20	215	537	8	9	9	
21	215	538	5	6	7	
22	215	539	7	9	9	
23	215	540	9	7	9	
24	215	541	8	7	6	
25	215	542	11	10	9	
26	215	543	8	8	6	
27	215	544	10	8	6	
28	215	545	16	10	6	
29	215	546	12	6	6	
30	215	547	14	6	4	
31	215	548	12	9	7	
32	215	549	15	8	4	
33	215	550	12	8	7	
34	215	551	8	11	8	
35	223	588	4.7	6.9		
36	285	585	7.8	9.7		
37	333	606	7.2	7.5		
38	338	581	7	7	7	
39	338	582	8	5	10	
40	338	583	9	6	8	
41	338	584	5	4	8	
42	338	585	8	8	6	
43	338	586	7	9	8	
44	338	587	8	10	7	
45	338	588	9	11	9	
46	338	589	9	14	8	
47	338	590	9	7	9	
48	338	591	10	11	9	
49	338	592	8	10	6	
50	338	593	9	5	9	
51	338	594	5	7	7	
52	384	625	2	3	5	
53	385	625	3	6	8	
54	386	625	5	9	8	
55	387	625	6	4	9	
56	388	625	8	6	10	
57	388	630	15	10	12	
58	389	625	7	7	7	
59	389	688	19	8	10	
60	389	690	6.8	14	16.7	10.1
61	370	625	8	5	8	
62	370	686	26	9	9	
63	370	687	32	8	8	
64	370	688	29	12	11	
65	370	689	7.3	8.6	21	12.3
66	370	690	10	11	9	
67	370	691	7.6	14.2	13.5	12.7
68	370	692	18	8	5	
69	370	715	16.3	7.6		
70	371	625	9	9	10	
71	371	688	20	15	8	
72	371	690	8.7	25.7	13.7	7.8
73	372	625	4	5	8	
74	372	690	19	15	14	
75	373	625	4	4	8	
76	374	625	3	3	8	
77	375	625	8	9	9	
78	375	710	8.4	15.3		
79	375	735	11.7	10.9		
80	375	740	4			
81	376	625	4	9	6	
82	377	625	7	8	9	
83	378	625	7	9	7	
84	379	625	8	6	11	
85	380	625	5	7	7	
86	380	660	9.1	10		
87	380	735	13.2	6.9		





**NOTES**

READINGS ARE IN MICRO-R/HR ( $\mu\text{R}/\text{hr}$ )

INSTRUMENT: LUDLUM MICRO-R METER

SERIAL NO: 138420

MODEL NO: 19

BACKGROUND: 7  $\mu\text{R}/\text{hr}$

15 0 15

SCALE IN METERS

**LEGEND**

9.  $\leq 17 \mu\text{R}/\text{hr}$

20.  $> 17 \mu\text{R}/\text{hr}$

**CIMARRON CORPORATION**

CIMARRON FACILITY

PHASE II - SUB-AREA H

POST-REMEDIATION - DRAINAGE/BOUNDARY

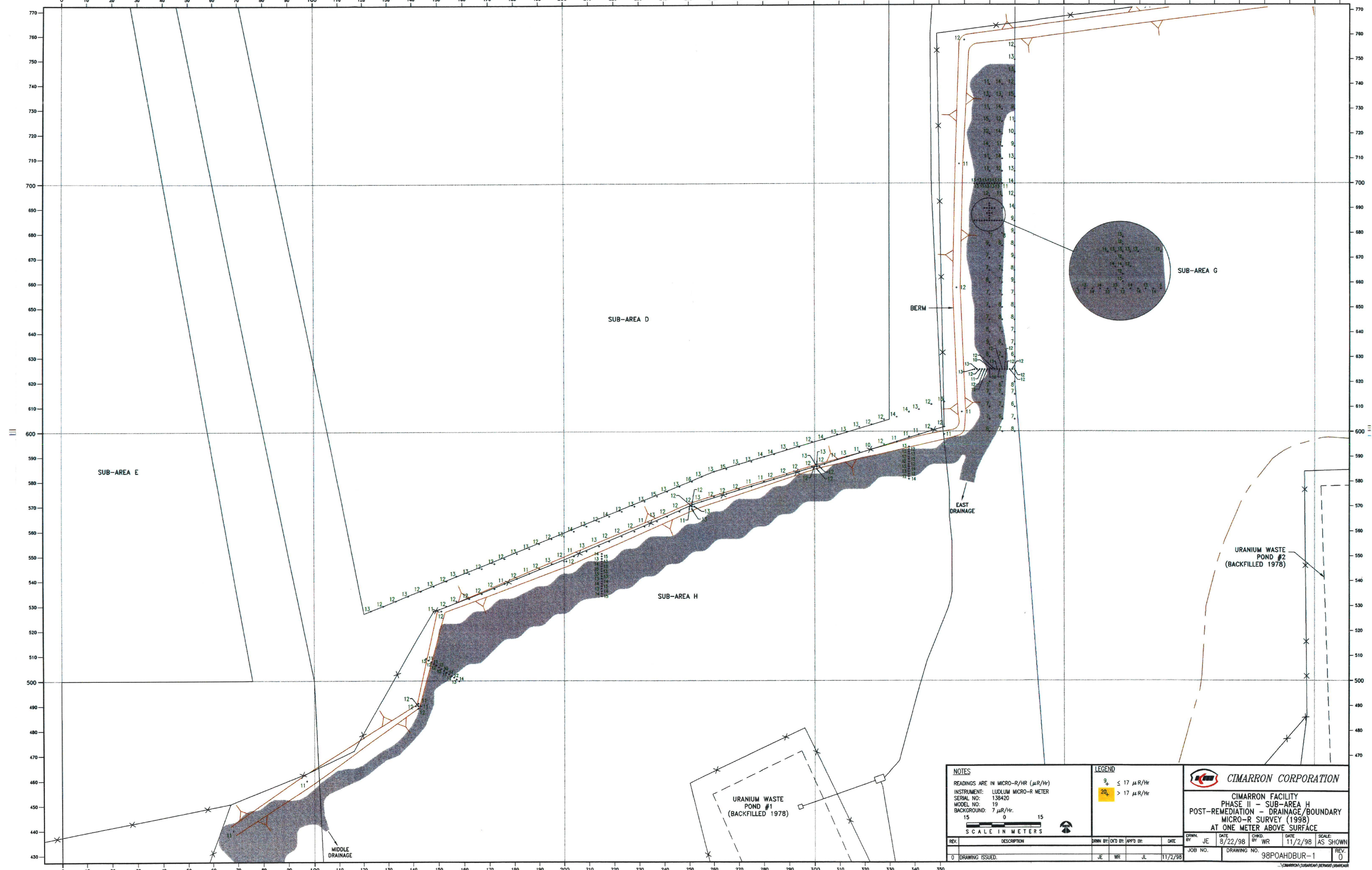
MICRO-R SURVEY (1998)

AT LAND SURFACE

DRWN BY: JE	DATE: 8/22/98	CHKD BY: WR	DATE: 11/2/98	SCALE: AS SHOWN
JOB NO. 98POAHDBUR-0		DRAWING NO. 98POAHDBUR-0		REV. 0

...CIMARRON'S SUBSIDIARY, BETHUNE, TEXAS



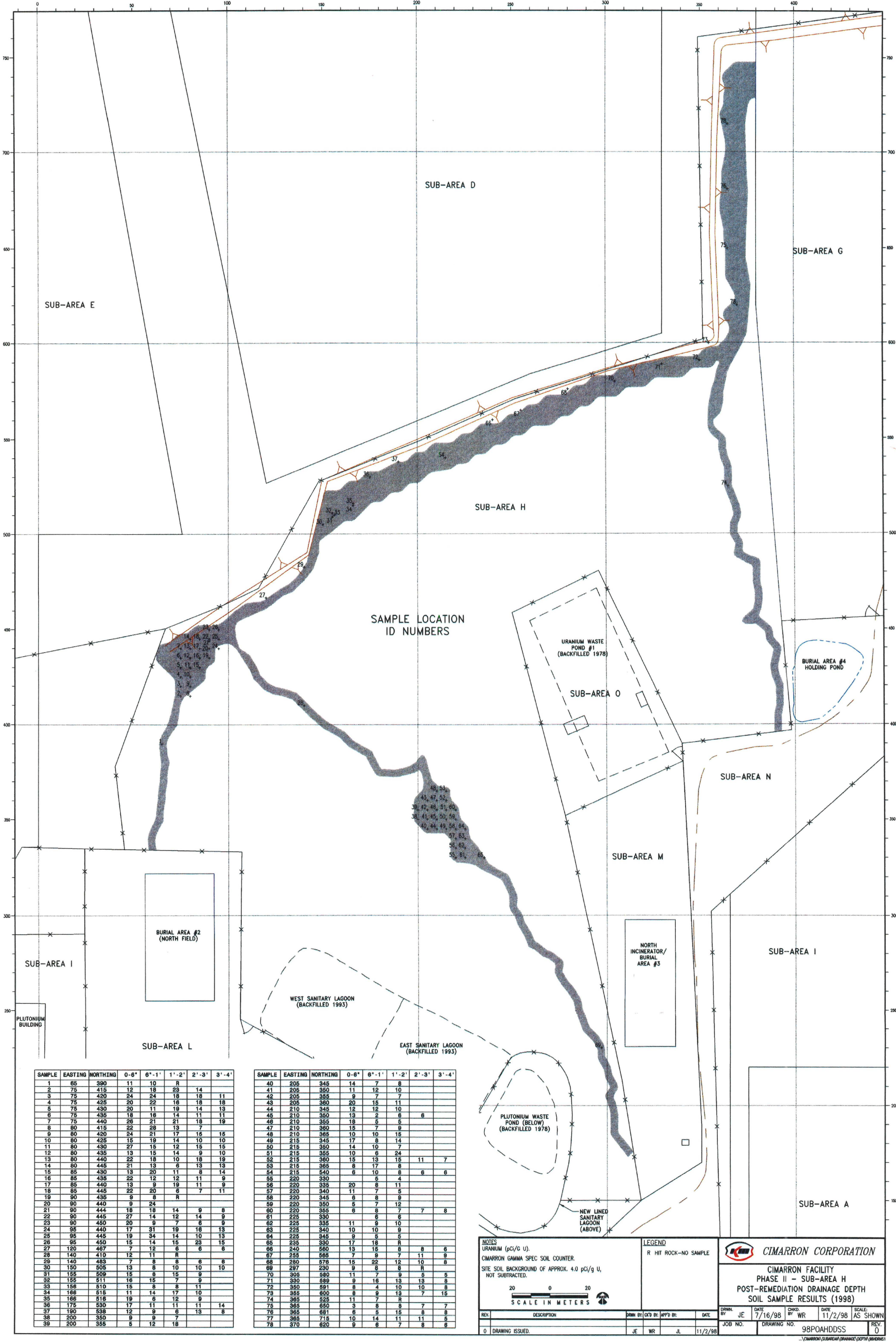


NOTES  
READINGS ARE IN MICRO-R/HR ( $\mu R/Hr$ )  
INSTRUMENT: LUDLUM MICRO-R METER  
SERIAL NO: 138420  
MODEL NO: 19  
BACKGROUND: 7  $\mu R/Hr$   
15 0 15  
SCALE IN METERS

LEGEND  
9+  $\leq 17 \mu R/Hr$   
20+  $> 17 \mu R/Hr$

CIMARRON CORPORATION			
CIMARRON FACILITY PHASE II - SUB-AREA H POST-REMEDIATION - DRAINAGE/BOUNDARY MICRO-R SURVEY (1998) AT ONE METER ABOVE SURFACE			
REV.	DESCRIPTION	DATE	SCALE: AS SHOWN
0	DRAWING ISSUED.	JE WR JL 11/2/98	
JOB NO.		DRAWING NO. 98POAHDBUR-1	REV. 0





SAMPLE LOCATION  
ID NUMBERS

SAMPLE	EASTING	NORTHING	0'-6"	6'-1'	1'-2'	2'-3'	3'-4'
1	65	390	11	10	R		
2	75	415	12	18	23	14	
3	75	420	24	24	18	11	
4	75	425	20	22	18	18	
5	75	430	20	11	19	14	13
6	75	435	18	16	14	11	11
7	75	440	26	21	21	18	19
8	80	415	22	28	13	7	
9	80	420	24	21	17	15	15
10	80	425	15	19	14	10	10
11	80	430	27	15	12	15	15
12	80	435	13	15	14	9	10
13	80	440	22	18	10	18	19
14	80	445	21	13	6	13	13
15	85	430	13	20	11	8	14
16	85	435	22	12	12	11	9
17	85	440	13	9	19	11	9
18	85	445	22	20	6	7	11
19	90	435	9	8			
20	90	440	9	24			
21	90	444	18	18	14	9	8
22	90	445	27	14	12	14	9
23	90	450	20	9	7	6	9
24	95	440	17	31	19	16	13
25	95	445	19	34	14	10	13
26	95	450	15	14	15	23	15
27	120	467	7	12	8	6	6
28	140	410	12	11	R		
29	140	483	7	8	8	6	6
30	150	505	13	8	10	10	10
31	155	509	15	8	15	9	
32	155	511	16	15	7	9	
33	158	510	15	8	8	11	
34	168	515	11	14	17	10	
35	166	516	19	6	12	9	
36	175	530	17	11	11	11	14
37	190	538	12	9	6	13	8
38	200	350	9	9	7		
39	200	355	5	12	18		

SAMPLE	EASTING	NORTHING	0'-6"	6'-1'	1'-2'	2'-3'	3'-4'
40	205	345	14	7	8		
41	205	350	11	12	10		
42	205	355	9	7	7		
43	205	360	20	15	11		
44	210	345	12	12	10		
45	210	350	13	2	6	6	
46	210	355	18	5	6		
47	210	360	15	7	9		
48	210	365	10	10	15		
49	215	345	17	8	14		
50	215	350	14	10	7		
51	215	355	10	5	24		
52	215	360	15	13	15	11	7
53	215	365	8	17	8		
54	215	540	6	10	8	6	6
55	220	330		5	4		
56	220	335	20	8	11		
57	220	340	11	7	5		
58	220	345	6	8	9		
59	220	350	5	7	12		
60	220	355	6	8	7	7	8
61	225	330		6	6		
62	225	335	11	9	10		
63	225	340	10	10	9		
64	225	345	9	5	5		
65	235	330	17	18	R		
66	240	560	13	15	8	8	6
67	255	565	7	9	7	11	9
68	280	576	15	22	12	10	8
69	297	230	9	8	9	R	
70	305	580	11	7	9	5	5
71	330	689	9	16	13	13	8
72	350	591	8	4	10	10	9
73	365	600	6	9	13	7	15
74	365	525	11	7	R		
75	365	650	3	8	8	7	7
76	365	681	6	5	15	8	8
77	365	715	10	14	11	11	5
78	370	620	9	6	7	6	6

NOTES

URANIUM (pCi/g U).

CIMARRON GAMMA SPEC SOIL COUNTER.

SITE SOIL BACKGROUND OF APPROX. 4.0 pCi/g U, NOT SUBTRACTED.

20 0 20

SCALE IN METERS

LEGEND

R HIT ROCK-NO SAMPLE

CIMARRON CORPORATION

CIMARRON FACILITY

PHASE II - SUB-AREA H

POST-REMEDIATION DRAINAGE DEPTH

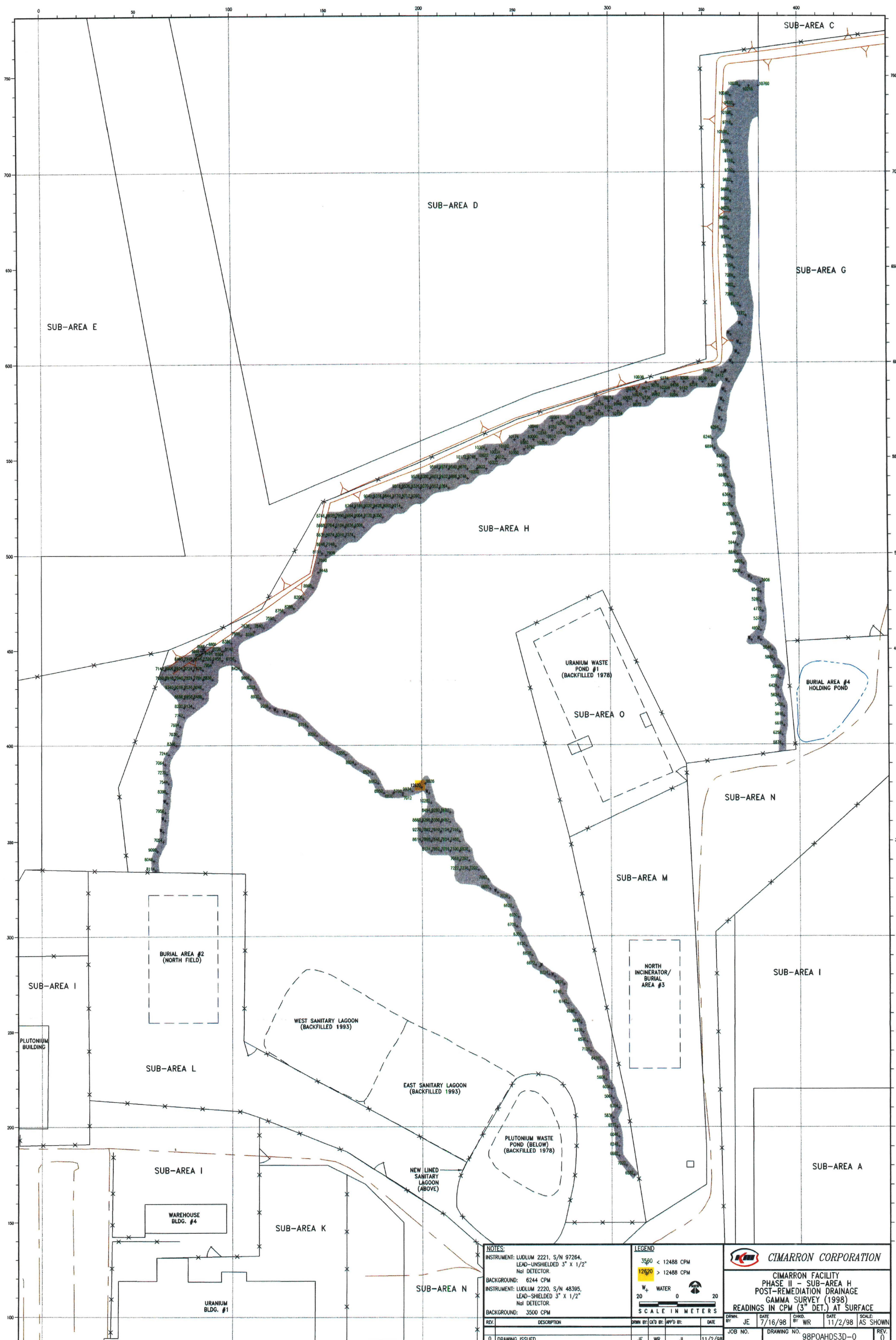
SOIL SAMPLE RESULTS (1998)

REV.	DESCRIPTION	DRAWN BY:	CHKD BY:	APPD BY:	DATE	DRAWN BY:	DATE	CHKD BY:	DATE	SCALE:
0	DRAWING ISSUED.	JE	WR	JL	11/2/98	JE	7/16/98	WR	11/2/98	AS SHOWN

JOB NO. DRAWING NO. 98POAHDSS REV. 0

\\CIMARRON\SUBAREA\DRAWING\DEPTH\SUBAREA H





**NOTES:**

INSTRUMENT: LUJLUM 2221, S/N 97284,  
LEAD-UNSHIELDED 3" X 1/2"  
NaI DETECTOR.

BACKGROUND: 6244 CPM

INSTRUMENT: LUJLUM 2220, S/N 48395,  
LEAD-SHIELDED 3" X 1/2"  
NaI DETECTOR.

BACKGROUND: 3500 CPM

**LEGEND**

3560 < 12488 CPM

12620 > 12488 CPM

WATER

SCALE IN METERS

20 0 20

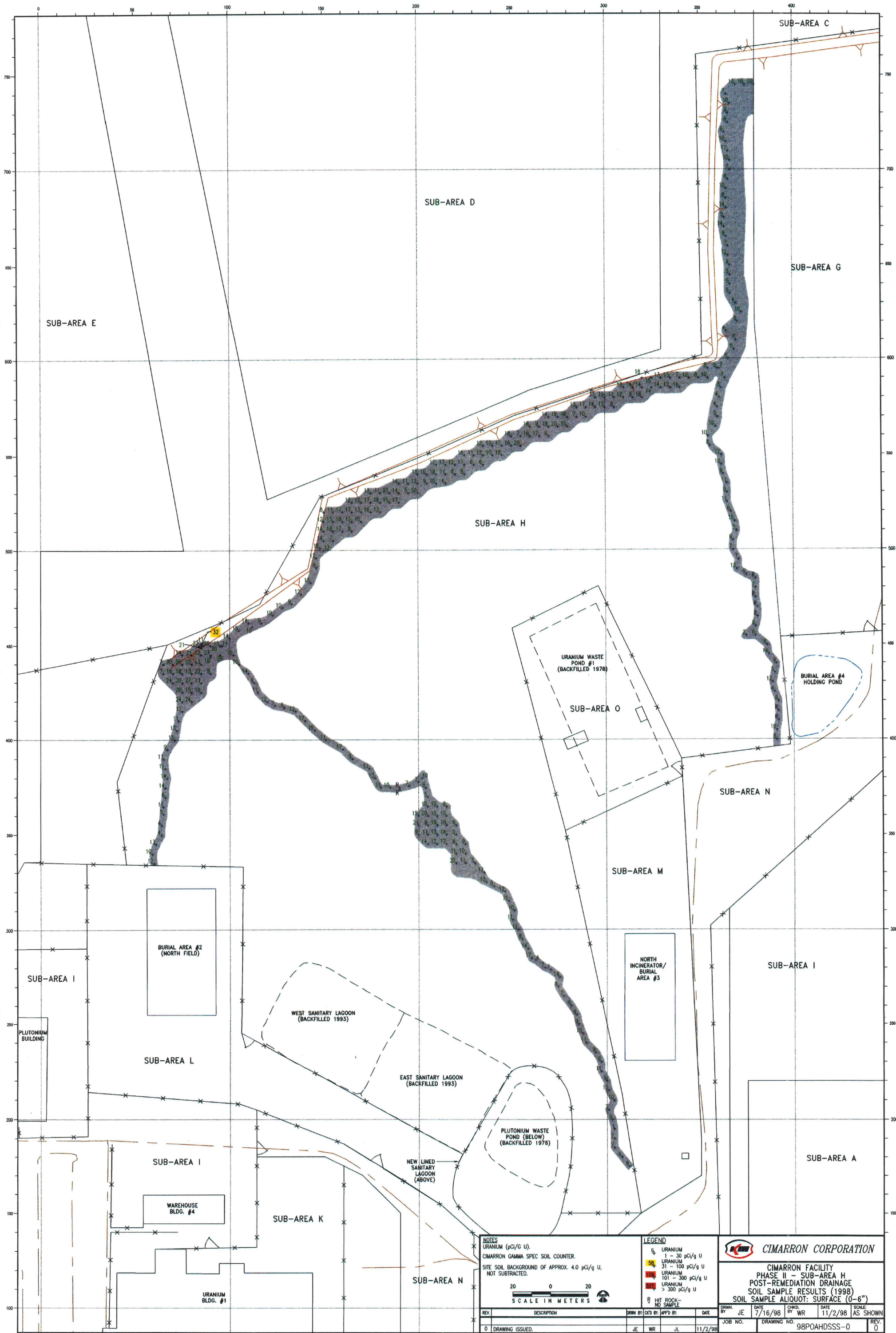
**CIMARRON CORPORATION**

CIMARRON FACILITY  
PHASE II - SUB-AREA H  
POST-REMEDIATION DRAINAGE  
GAMMA SURVEY (1998)  
READINGS IN CPM (3" DET.) AT SURFACE

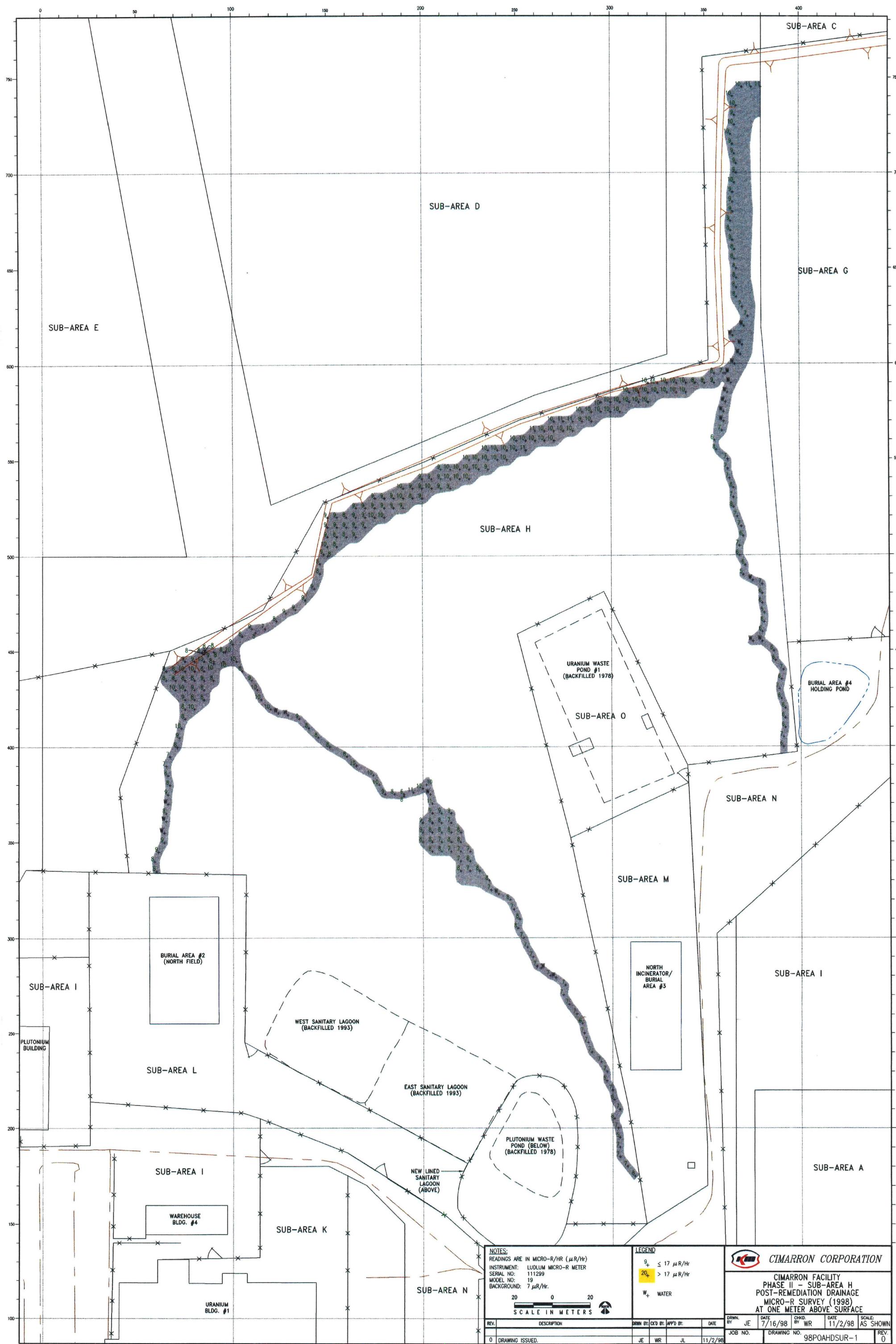
REV.	DESCRIPTION	DRWN BY	CHK'D BY	APP'D BY	DATE	DATE	SCALE
0	DRAWING ISSUED.	JE	WR	JL	11/2/98	11/2/98	AS SHOWN

JOB NO. DRAWING NO. 98POAHS3D-0 REV. 0

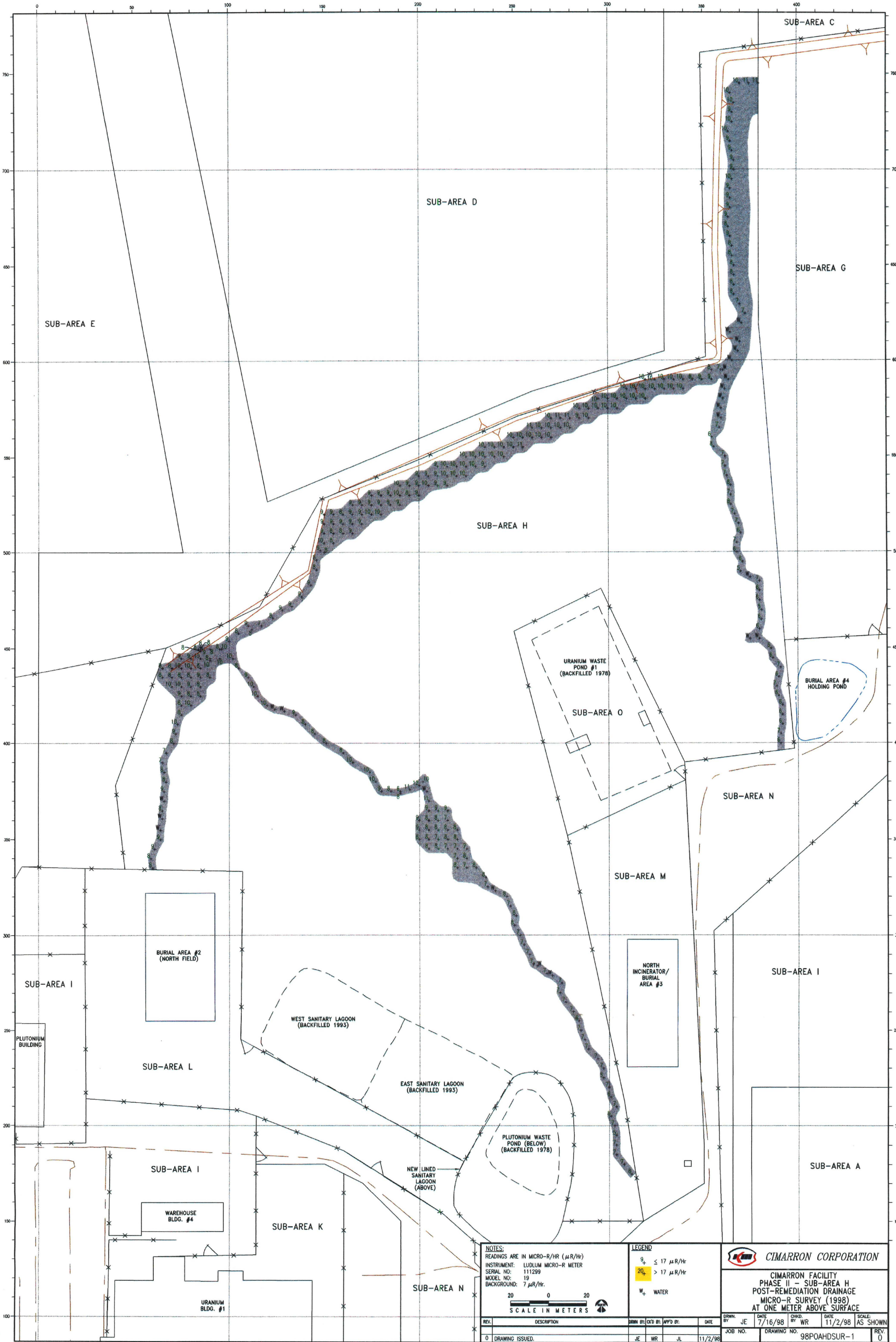












**NOTES:**  
READINGS ARE IN MICRO-R/HR ( $\mu R/hr$ )  
INSTRUMENT: LUDLUM MICRO-R METER  
SERIAL NO: 111299  
MODEL NO: 19  
BACKGROUND: 7  $\mu R/hr$

**LEGEND**  
 $S_1 \leq 17 \mu R/hr$   
 $S_2 > 17 \mu R/hr$   
W<sub>1</sub> WATER

**CIMARRON CORPORATION**  
CIMARRON FACILITY  
PHASE II - SUB-AREA H  
POST-REMEDIATION DRAINAGE  
MICRO-R SURVEY (1998)  
AT ONE METER ABOVE SURFACE

REV.	DESCRIPTION	DRWN BY:	CHKD BY:	APP'D BY:	DATE
0	DRAWING ISSUED.	JE	WR	JL	11/2/98

DATE	CHKD BY	DATE	SCALE
7/16/98	WR	11/2/98	AS SHOWN

JOB NO.	DRAWING NO.	REV.
	98POAHSUR-1	0

\\CIMARRON\SUBAREA\DRAWING\SURFACE\SUBAREA

**CIMARRON CORPORATION  
CIMARRON FACILITY  
SUB-AREA "H" UNAFFECTED**

DATE: 08/3/98

LN #	GRID NUMBER	3" DETECT C.P.M.	MICRO R' SURF	MICRO R' 1 METER	pCi/g					
					0-6" Sample		6" - 1'		1' - 2'	
					Total-U	Th (Nat)	Total-U	Th (Nat)	Total-U	Th (Nat)
* 1	10W - 300N	5290	14	13	6	1.4				
2	0E - 390N	8498	9	8	8.3	1.4				
3	0E - 460N	8278	9	9	8.5	1.3				
4	0E - 470N	8106	9	8	10	1.4				
5	0E - 480N	8202	9	8	8.6	1.3				
6	0E - 1150N	5788	6	7	8.1	0.5				
* 7	10E - 350N	5390	14	14	6.3	1.3				
8	20E - 940N	5482	6	7	6.4	0.4				
9	30E - 940N	5492	8	6	4.9	0.3				
10	40E - 460N	7839	8	8	7.8	1.1				
11	40E - 480N	7966	9	9	8.6	1.2				
12	50E - 450N	7762	8	8	7.9	1.2				
13	50E - 470N	8010	9	9	8.7	1.4				
14	60E - 770N	7446	9	9	8.4	0.8				
15	60E - 1140N	5810	6	6	6.3	0.4				
16	70E - 740N	7862	9	8	9.6	1.2				
17	78E - 500N	8720	9	8	7.9	1.3	5.7	1.5	6.9	1.3
18	79E - 500N	8720	9	9	10.4	1.2	7.2	1.2	6.8	1.2
19	80E - 498N	9008	9	9	9.3	1.2	6.2	1.4	7.6	1.3
20	80E - 499N	8480	8	8	13.5	1.4	10.4	0.9	7.2	1.1

**INSTRUMENTS:**

LUDLUM MICRO 'R' METER - MODEL 19 S/N 111299

LUDLUM 2221, UNSHIELDED 3" X 1/2" NaI DETECTOR #97264

\*LUDLUM 2220, SHIELDED 3" X 1/2" NaI DETECTOR #48395

CIMMARON SOIL COUNTER 4" X 4" X 16" NaI DETECTOR

BACKGROUND NOT SUBTRACTED

PAGE 1

FILE: HUSS

**RESULTS IN:**

μR/hr

CPM

pCi/g

**BACKGROUND**

7-10

7670

2800

Total U

Th(Nat)

4

1.5

**MDA**

2

N/A

N/A

10

1

REVIEWED BY:

*W.A. Rogers*

DATE:

*8-4-98*



**CIMARRON CORPORATION  
CIMARRON FACILITY  
SUB-AREA "H" UNAFFECTED**

DATE: 08/3/98

LN #	GRID NUMBER	3" DETECT C.P.M.	MICRO R' SURF	MICRO R' 1 METER	pCi/g					
					0-6" Sample		6" - 1'		1' - 2'	
					Total-U	Th (Nat)	Total-U	Th (Nat)	Total-U	Th (Nat)
1	80E - 500N	7760	7	9	12.1	1.1	7.5	1.5	5.2	1.1
2	80E - 501N	8560	9	8	12.4	1.4	8.4	1.3	9.5	1.2
3	80E - 502N	8782	9	8	8.7	1.5	6.6	1.2	6.8	1.3
4	80E - 710N	8406	8	8	9.5	1.4				
5	81E - 500N	8688	10	9	11.8	1.3	8.4	1.3	7.8	1.2
6	82E - 500N	8982	9	9	9.6	1.2	8.9	1.2	6.6	1.1
7	150E - 360N	6534	8	8	7.7	1.2				
8	160E - 460N	8238	9	9	9.6	1.5				
9	170E - 360N	7564	7	8	5.2	1.2				
10	190E - 400N	8114	8	8	5.4	1.4				
11	210E - 420N	8252	10	9	7.9	1.5				
12	210E - 430N	8276	9	8	7.1	1.7				
13	22E - 500N	7670	9	8	8.8	1.5				
*14	240E - 350N	2860	9	9	5.4	1.3				
*15	250E - 350N	4510	13	12	3.9	0.8				
16	260E - 470N	8264	9	9	6.6	1.4				
17	260E - 540N	6712	7	7	8.3	1.5				
18	360E - 490N	7406	8	9	7.5	1.4				
19	360E - 500N	7120	8	8	7.3	1.2				
20	370E - 450N	7860	8	8	7.6	1.5				

**INSTRUMENTS:**

LUDLUM MICRO 'R' METER - MODEL 19 S/N #111299

LUDLUM 2221, UNSHIELDED 3" X 1/2" NaI DETECTOR S/N #97264

\*LUDLUM 2220, SHIELDED 3" X 1/2" NaI DETECTOR #48395

CIMMARON SOIL COUNTER 4" X 4" X 16" NaI DETECTOR

BACKGROUND NOT SUBTRACTED

PAGE 2

FILE: HUSS

**RESULTS IN:**

μR/hr

CPM

pCi/g

**BACKGROUND**

**MDA**

7-10

2

7670

N/A

2800

N/A

Total U

4

10

Th(Nat)

1.5

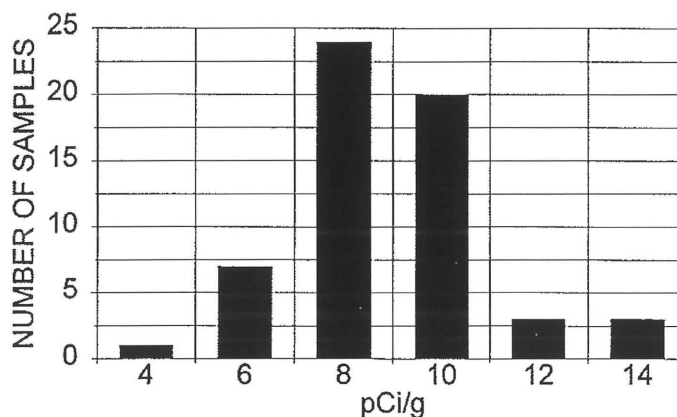
1

**REVIEWED BY:** W.A. Rogers

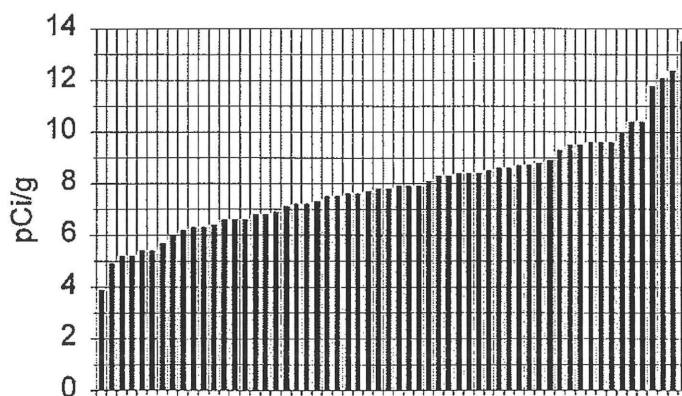
**DATE:** 8-4-98

SUB-AREA "H" - UNAFFECTED  
CIMARRON SOIL COUNTER  
TOTAL URNAIUM SAMPLE RESULTS  
SITE BACKGROUND OF 4 pCi/g NOT SUBTRACTED  
AUGUST 1998

**URANIUM SAMPLE RESULTS**  
FREQUENCY DISTRIBUTION



**URANIUM SAMPLE RESULTS**  
SURVEY DATA



NUMBER OF SAMPLES	58
AVERAGE SAMPLE	8
MINIMUM SAMPLE	3.9
MAXIMUM SAMPLE	13.5
STANDARD DEVIATION	1.88

CIMARRON CORPORATION - CIMARRON FACILITY  
TRUE MEAN ACTIVITY VS. GUIDELINE VALUE AT 95% CONFIDENCE  
SUB-AREA "H" - UNAFFECTED

n = pCi/g TOTAL U

Number	n	(n-N)	(n-N) <sup>2</sup>
1	6.0	-2.0	3.8
2	8.3	0.3	0.1
3	8.5	0.5	0.3
4	10.0	2.0	4.2
5	8.6	0.6	0.4
6	8.1	0.1	0.0
7	6.3	-1.7	2.8
8	6.4	-1.6	2.4
9	4.9	-3.1	9.4
10	7.8	-0.2	0.0
11	8.6	0.6	0.4
12	7.9	-0.1	0.0
13	8.7	0.7	0.5
14	8.4	0.4	0.2
15	6.3	-1.7	2.8
16	9.6	1.6	2.7
17	7.9	-0.1	0.0
18	10.4	2.4	6.0
19	9.3	1.3	1.8
20	13.5	5.5	30.7
21	12.1	4.1	17.2
22	12.4	4.4	19.7
23	8.7	0.7	0.5
24	9.5	1.5	2.4
25	11.8	3.8	14.8
26	9.6	1.6	2.7
27	7.7	-0.3	0.1
28	9.6	1.6	2.7
29	5.2	-2.8	7.6
30	5.4	-2.6	6.5
31	7.9	-0.1	0.0
32	7.1	-0.9	0.7
33	8.8	0.8	0.7
34	5.4	-2.6	6.5
35	3.9	-4.1	16.5
36	6.6	-1.4	1.8
37	8.3	0.3	0.1
38	7.5	-0.5	0.2
39	7.3	-0.7	0.4
40	7.6	-0.4	0.1
41	5.7	-2.3	5.1
42	7.2	-0.8	0.6
43	6.2	-1.8	3.1
44	10.4	2.4	6.0
45	7.5	-0.5	0.2
46	8.4	0.4	0.2
47	6.6	-1.4	1.8
48	8.4	0.4	0.2
49	8.9	0.9	0.9
50	6.9	-1.1	1.1
	57.5		15.2
	0.0		0.0
	0.0		0.0
	0.0		0.0
	0.0		0.0
	0.0		0.0
	0.0		0.0
	0.0		0.0
	0.0		0.0
	461.6		204.3
	Sum(n)		Sum(n-N) <sup>2</sup>

No. of Samples (x) : 58

COUNT TIME: 5 MINUTES

Sample Mean (N) = Sum(n) ÷ (x)

Sample Mean (N) : 7.96

Standard Deviation (Sd) = SQRT [(n-N)<sup>2</sup> ÷ (x - 1)]

Standard Deviation: 1.89

2 Std Deviations: 3.79

Degree of Freedom(df) = (x) - 1 Data listed on Table B-1

(df) = 1.666

Area's Average Level (Ap) = (N) + (df) x [(Sd)/SQRT(x)]

(Ap) = 8.37

GUIDELINE VALUE: 30

Acceptable Level: 34.0

pCi/gU TOTAL U

pCi/gU TOTAL U

pCi/gU TOTAL U

TABLE B - 1

Factors for Comparison of Survey Data with Guidelines					
(df)	95%	97.5%	(df)	95%	97.5%
1	6.314	12.706	19	1.729	2.093
2	2.92	4.303	20	1.725	2.086
3	2.353	3.182	21	1.721	2.08
4	2.132	2.776	22	1.717	2.074
5	2.015	2.571	23	1.714	2.069
6	1.943	2.447	24	1.711	2.064
7	1.895	2.365	25	1.708	2.06
8	1.86	2.306	26	1.706	2.056
9	1.833	2.262	27	1.703	2.052
10	1.812	2.228	28	1.701	2.048
11	1.796	2.201	29	1.699	2.045
12	1.782	2.179	30	1.697	2.042
13	1.771	2.16	40	1.684	2.021
14	1.761	2.145	60	1.671	2
15	1.753	2.131	120	1.658	1.98
16	1.746	2.12	400	1.649	1.966
17	1.74	2.11	Infinite	1.645	1.96
18	1.734	2.101			

For values of Degrees of Freedom not listed:

Interpolate between the listed values.

(df) high value(Z)	60	is (B)	1.671	95%
(df) low value(Y)	40	is (A)	1.684	95%

Desired value(df) (X) 67 is calculated as follow:

EXP[(Ln(B)-Ln(A)) ÷ (Z-Y) × (X-Y) + Ln(A)]

The (df) value for (X) 67 1.666 95%

PERFORMED BY: Deanna Luckey

DATE: 8/21/98

REVIEWED BY: W. A. Rogers

DATE: 8-21-98



**CIMARRON CORPORATION - CIMARRON FACILITY**  
**TRUE MEAN ACTIVITY VS. GUIDELINE VALUE AT 95% CONFIDENCE**  
**SUB-AREA "H" - UNAFFECTED**

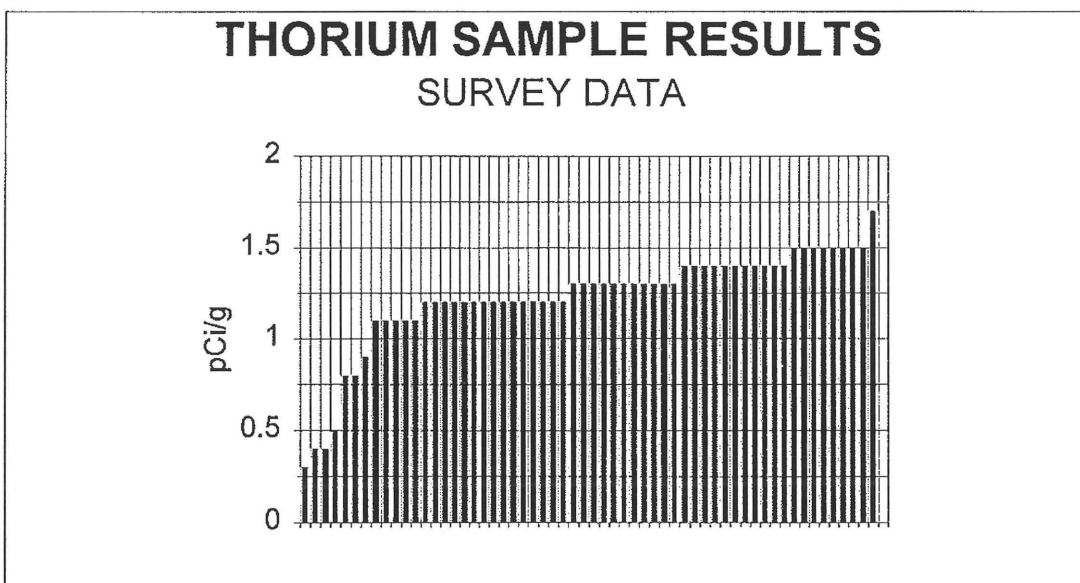
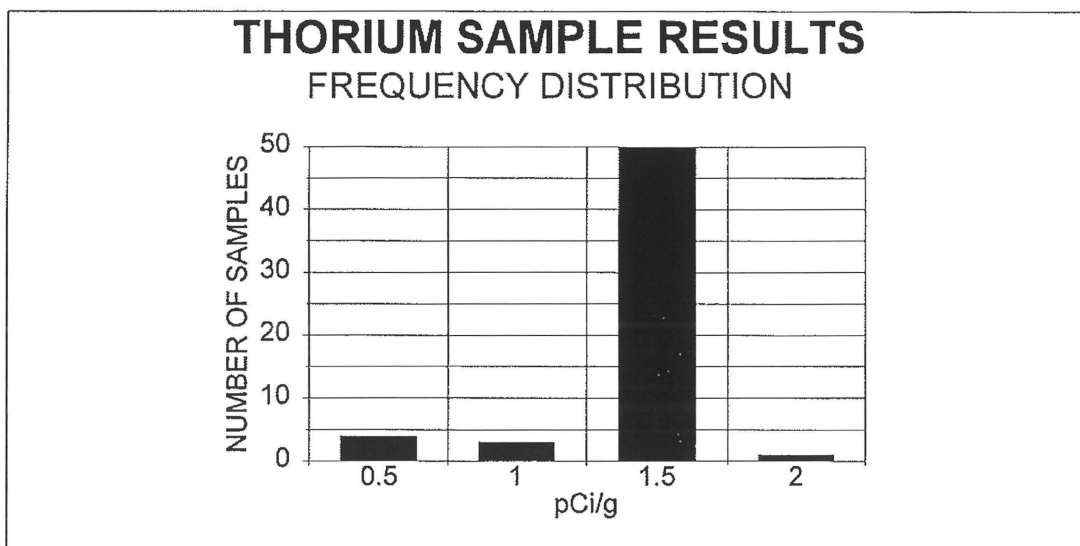
n = pCi/g TOTAL U

Number	n	(n-N)	(n-N) <sup>2</sup>
51	6.8	-1.16	1.34
52	7.6	-0.36	0.13
53	7.2	-0.76	0.58
54	5.2	-2.76	7.61
55	9.5	1.54	2.38
56	6.8	-1.16	1.34
57	7.8	-0.16	0.03
58	6.6	-1.36	1.85
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98			
99			
100			
	57.5		15.2
	Sum(n)		Sum(n-N) <sup>2</sup>

n = pCi/g TOTAL U

Number	n	(n-N)	(n-N) <sup>2</sup>
101			
102			
103			
104			
105			
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107			
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144			
145			
146			
147			
148			
149			
150			
	0.0		0.0
	Sum(n)		Sum(n-N) <sup>2</sup>

**SUB-AREA "H" - UNAFFECTED  
CIMARRON SOIL COUNTER  
TOTAL THORIUM SAMPLE RESULTS  
SITE BACKGROUND OF 1.5 pCi/g NOT SUBTRACTED  
AUGUST 1998**



NUMBER OF SAMPLES	58
AVERAGE SAMPLES	1.22
MINIMUM SAMPLES	0.3
MAXIMUM SAMPLES	1.7
STANDARD DEVIATION	0.279

$$n = \text{pCi/g Th (NAT)}$$

Number	n	(n-N)	(n-N) <sup>2</sup>
1	1.4	0.2	0.0
2	1.4	0.2	0.0
3	1.3	0.1	0.0
4	1.4	0.2	0.0
5	1.3	0.1	0.0
6	0.5	-0.7	0.5
7	1.3	0.1	0.0
8	0.4	-0.8	0.7
9	0.3	-0.9	0.9
10	1.1	-0.1	0.0
11	1.2	-0.0	0.0
12	1.2	-0.0	0.0
13	1.4	0.2	0.0
14	0.8	-0.4	0.2
15	0.4	-0.8	0.7
16	1.2	-0.0	0.0
17	1.3	0.1	0.0
18	1.2	-0.0	0.0
19	1.2	-0.0	0.0
20	1.4	0.2	0.0
21	1.1	-0.1	0.0
22	1.4	0.2	0.0
23	1.5	0.3	0.1
24	1.4	0.2	0.0
25	1.3	0.1	0.0
26	1.2	-0.0	0.0
27	1.2	-0.0	0.0
28	1.5	0.3	0.1
29	1.2	-0.0	0.0
30	1.4	0.2	0.0
31	1.5	0.3	0.1
32	1.7	0.5	0.2
33	1.5	0.3	0.1
34	1.3	0.1	0.0
35	0.8	-0.4	0.2
36	1.4	0.2	0.0
37	1.5	0.3	0.1
38	1.4	0.2	0.0
39	1.2	-0.0	0.0
40	1.5	0.3	0.1
41	1.5	0.3	0.1
42	1.2	-0.0	0.0
43	1.4	0.2	0.0
44	0.9	-0.3	0.1
45	1.5	0.3	0.1
46	1.3	0.1	0.0
47	1.2	-0.0	0.0
48	1.3	0.1	0.0
49	1.2	-0.0	0.0
50	1.3	0.1	0.0
	9.5		0.1
	71		4.5
	Sum(n)		Sum(n-N) <sup>2</sup>

No. of Samples (x) :	58
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**COUNT TIME: 5 MINUTES**

**Sample Mean (N) =  $\text{Sum}(n) \div (x)$**

Sample Mean (N) : 1.22

**Standard Deviation (Sd) = SQRT [(n-N)<sup>2</sup> ÷ (x - 1)]**

Standard Deviation: 0.28

2 Std Deviations:	0.56
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**Degree of Freedom(df).= (x) - 1**      Data listed on Table B-1

$$(df) = 1.673$$

**Area's Average Level ( $A_{\mu}$ ) = (N) + (df) x [(Sd)/SQRT(x)]**

(A<sub>μ</sub>) = 1.29 pCi/gTh (NAT)

GUIDELINE VALUE:	10	pCi/gTh (NAT)
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Acceptable Level:	11.5	pCi/gTh (NAT)
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TABLE B - 1

Factors for Comparison of Survey Data with Guidelines					
(df)	95%	97.5%	(df)	95%	97.5%
1	6.314	12.706	19	1.729	2.093
2	2.92	4.303	20	1.725	2.086
3	2.353	3.182	21	1.721	2.08
4	2.132	2.776	22	1.717	2.074
5	2.015	2.571	23	1.714	2.069
6	1.943	2.447	24	1.711	2.064
7	1.895	2.365	25	1.708	2.06
8	1.86	2.306	26	1.706	2.056
9	1.833	2.262	27	1.703	2.052
10	1.812	2.228	28	1.701	2.048
11	1.796	2.201	29	1.699	2.045
12	1.782	2.179	30	1.697	2.042
13	1.771	2.16	40	1.684	2.021
14	1.761	2.145	60	1.671	2
15	1.753	2.131	120	1.658	1.98
16	1.746	2.12	400	1.649	1.966
17	1.74	2.11	Infinte	1.645	1.96
18	1.734	2.101			

**For values of Degrees of Freedom not listed:**

Interpolate between the listed values.

(df) high value(Z)	60	ls (B)	1.671	95%
(df) low value(Y)	40	ls (A)	1.684	95%

Desired value(df) (X)	57	is calculated as follow:
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$$\text{EXP}[(\text{Ln}(\text{B}) - \text{Ln}(\text{A})) \div (\text{Z} - \text{Y})] (\text{X} - \text{Y}) + \text{Ln}(\text{A})]$$

The (df) value for (X)	57	1.673	95%
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PERFORMED BY: Deanna Tucker

DATE: 8-2/-98

REVIEWED BY: W.O. Rogers

DATE: 5-21-78

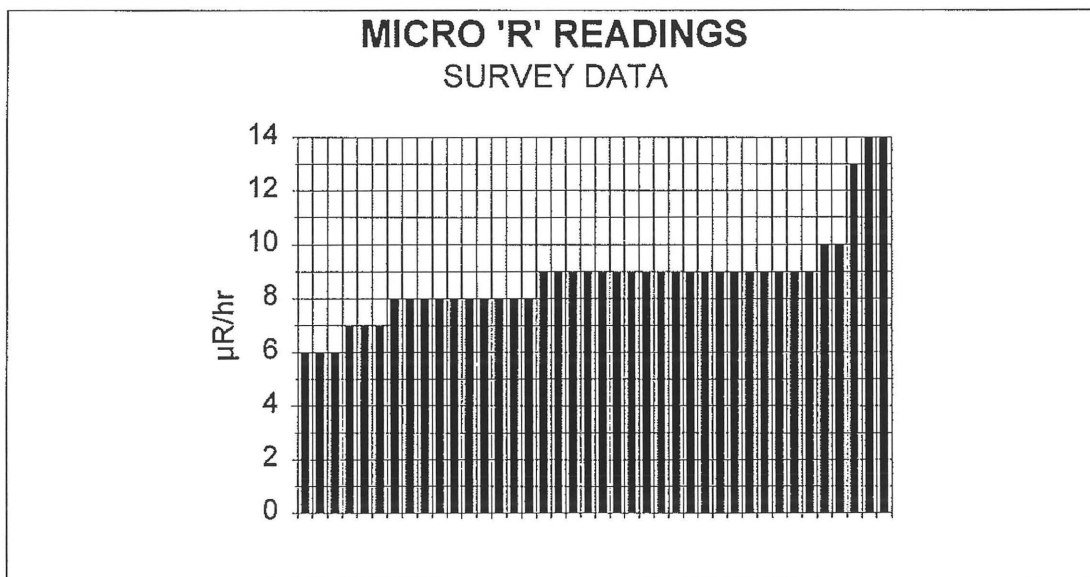
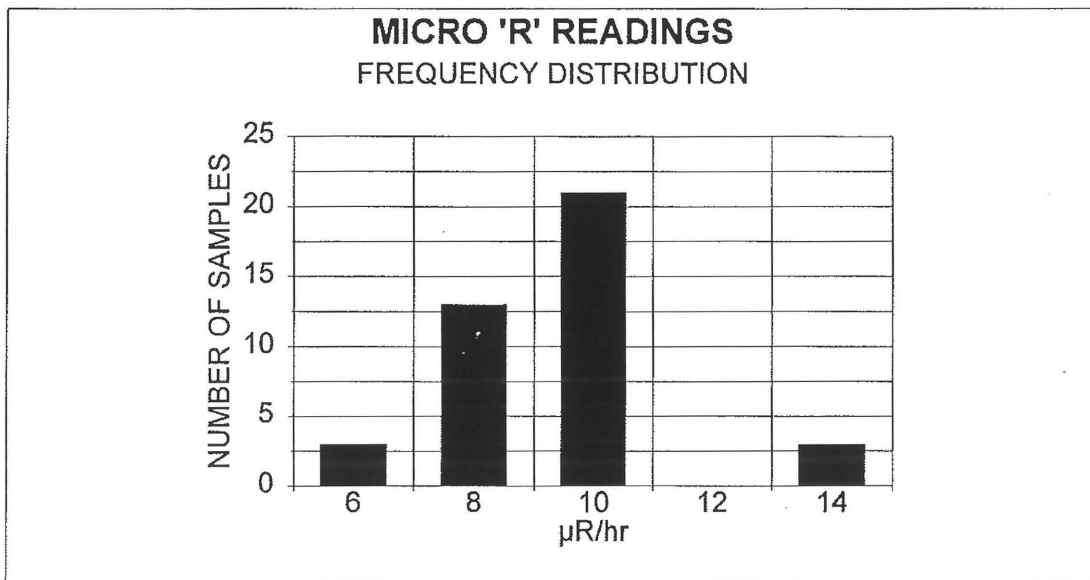
CIMARRON CORPORATION - CIMARRON FACILITY  
TRUE MEAN ACTIVITY VS. GUIDELINE VALUE AT 95% CONFIDENCE  
SUB-AREA "H" - UNAFFECTED

n = pCi/g Th (NAT)			
Number	n	(n-N)	(n-N) <sup>2</sup>
51	1.2	-0.02	0.00
52	1.3	0.08	0.01
53	1.1	-0.12	0.02
54	1.1	-0.12	0.02
55	1.2	-0.02	0.00
56	1.3	0.08	0.01
57	1.2	-0.02	0.00
58	1.1	-0.12	0.02
59			
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95			
96			
97			
98			
99			
100			
	9.5		0.1
	Sum(n)		Sum(n-N) <sup>2</sup>

n = pCi/g Th (NAT)			
Number	n	(n-N)	(n-N) <sup>2</sup>
101			
102			
103			
104			
105			
106			
107			
108			
109			
110			
111			
112			
113			
114			
115			
116			
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136			
137			
138			
139			
140			
141			
142			
143			
144			
145			
146			
147			
148			
149			
150			
	0.0		0.0
	Sum(n)		Sum(n-N) <sup>2</sup>

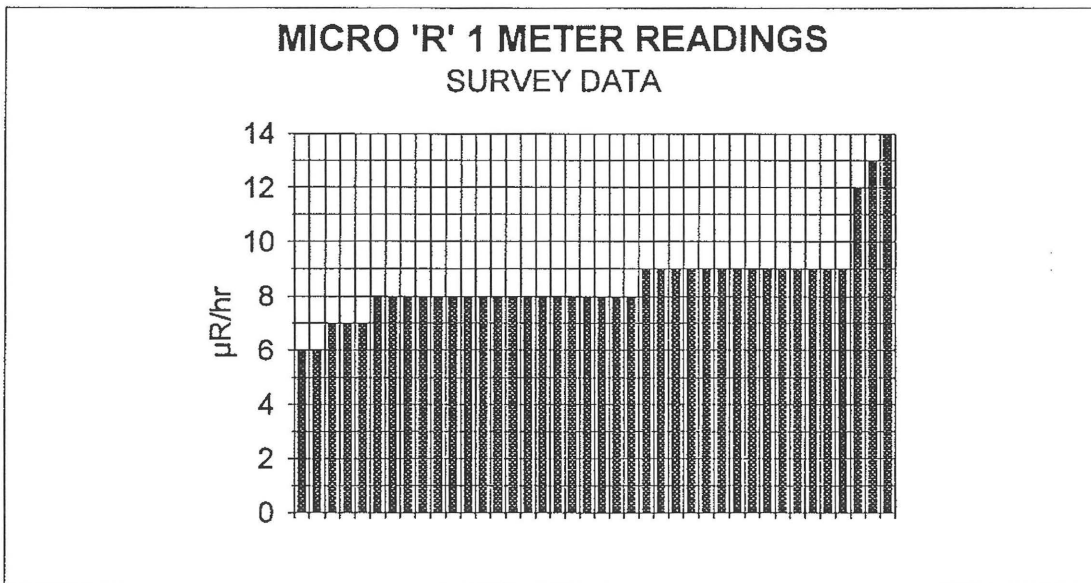
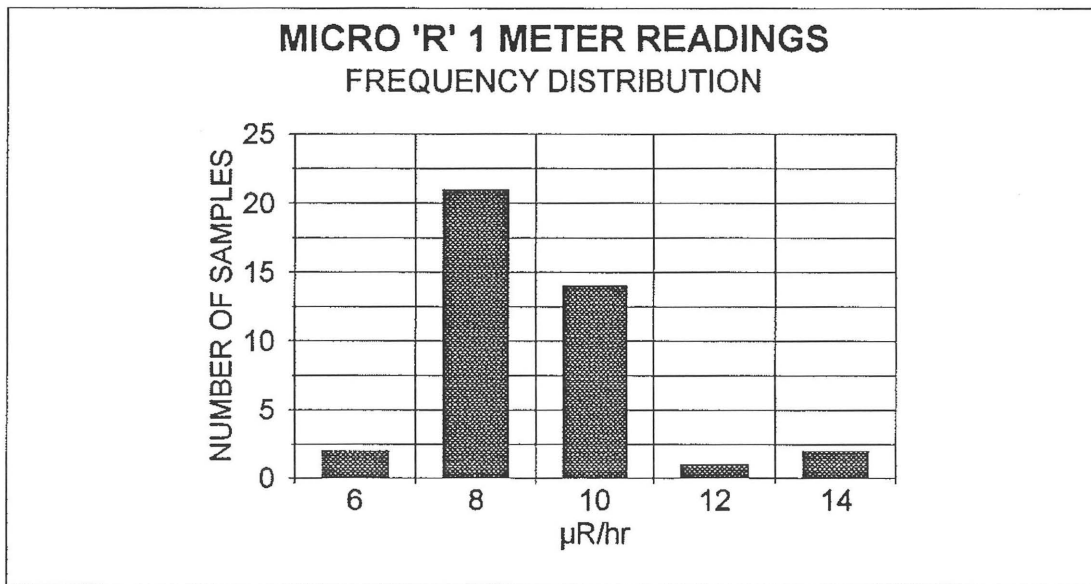


**SUB-AREA "H" - UNAFFECTED  
LUDLUM MICRO 'R' METER MODEL 19  
MICRO 'R' SURFACE READINGS  
AUGUST 1998**



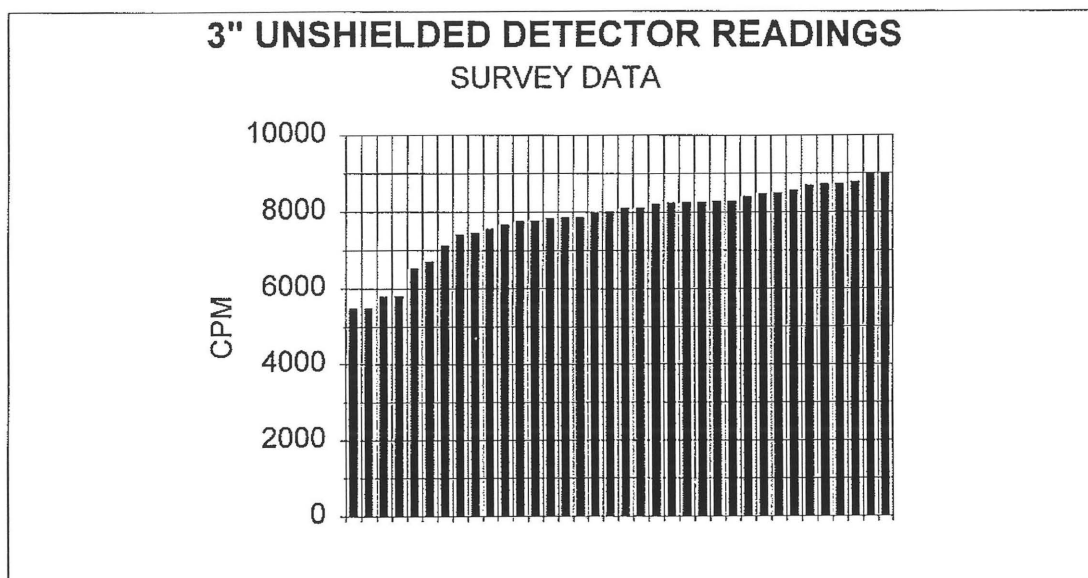
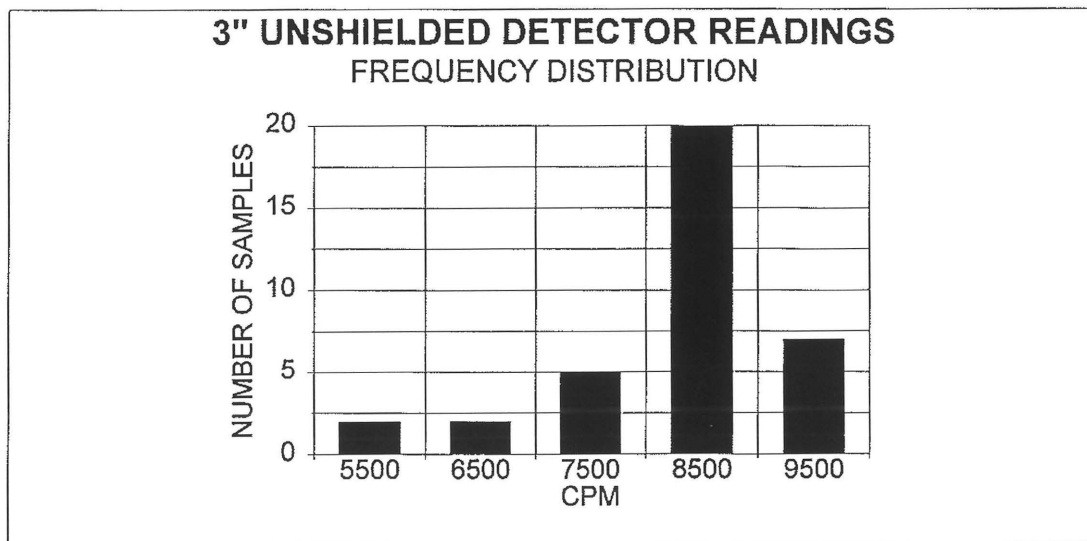
NUMBER OF SAMPLES	40
AVERAGE SAMPLE	9
MINIMUM SAMPLE	6
MAXIMUM SAMPLE	14
STANDARD DEVIATION	2

**SUB-AREA "H" - UNAFFECTED  
LUDLUM MICRO 'R' METER MODEL 19  
MICRO 'R' READINGS at 1 METER  
AUGUST 1998**



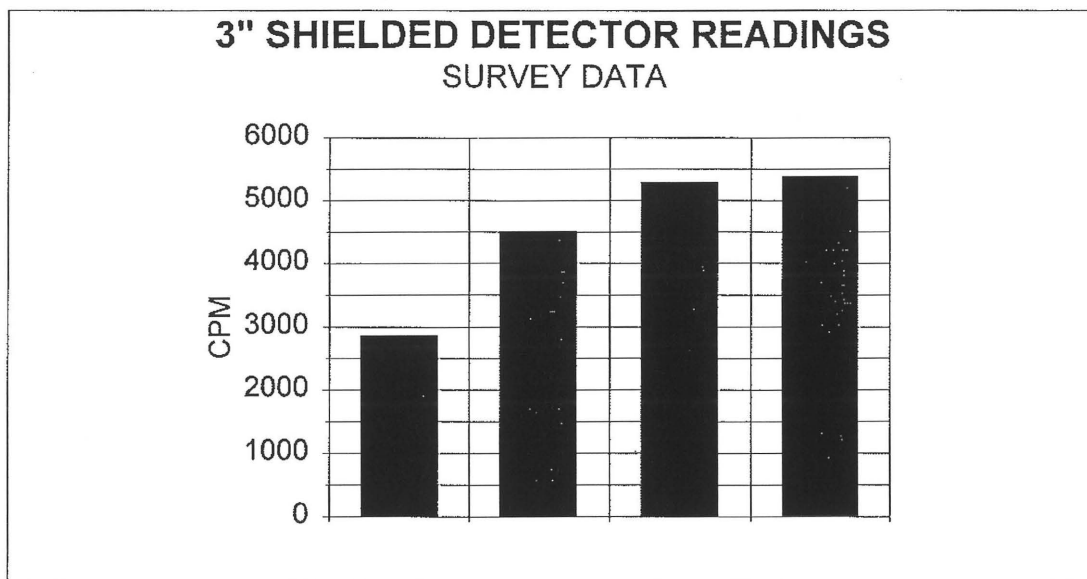
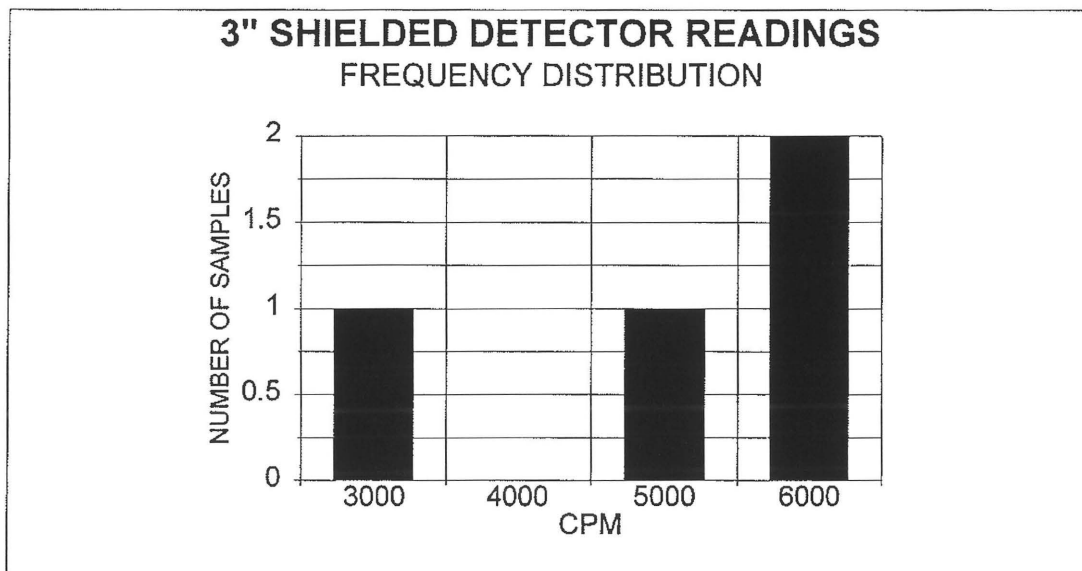
NUMBER OF SAMPLES	40
AVERAGE SAMPLE	9
MINIMUM SAMPLE	6
MAXIMUM SAMPLE	14
STANDARD DEVIATION	2

**SUB-AREA "H" - UNAFFECTED  
LUDLUM 2221, UNSHIELDED 3" X 1/2" NaI DETECTOR  
3" DETECTOR UNSHIELDED SURFACE  
AUGUST 1998**



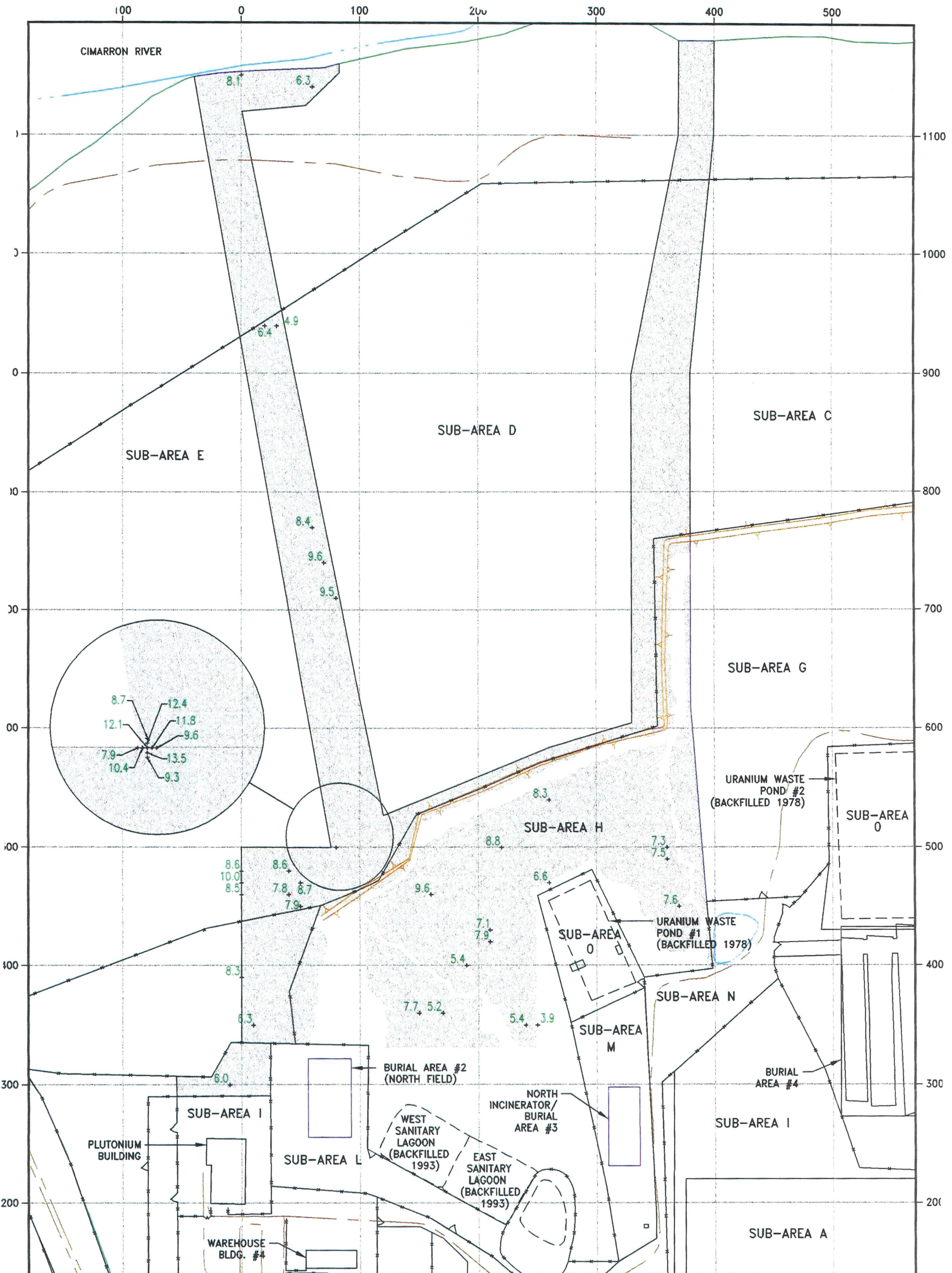
<b>NUMBER OF SAMPLES</b>	<b>36</b>
<b>AVERAGE SAMPLE</b>	<b>7796</b>
<b>MINIMUM SAMPLE</b>	<b>5482</b>
<b>MAXIMUM SAMPLE</b>	<b>9008</b>
<b>STANDARD DEVIATION</b>	<b>943</b>

**SUB-AREA "H" - UNAFFECTED  
LUDLUM 2220, SHIELDED 3" X 1/2" NaI DETECTOR  
3" SHIELDED DETECTOR SURFACE  
AUGUST 1998**



<b>NUMBER OF SAMPLES</b>	<b>4</b>
<b>AVERAGE SAMPLE</b>	<b>4513</b>
<b>MINIMUM SAMPLE</b>	<b>2860</b>
<b>MAXIMUM SAMPLE</b>	<b>5390</b>
<b>STANDARD DEVIATION</b>	<b>1013</b>





#### LEGEND

- 6+ URANIUM, 1 - 30 pCi/g U
- 58+ URANIUM, 31 - 100 pCi/g U
- 129+ URANIUM, 101 - 300 pCi/g U
- 327+ URANIUM, > 300 pCi/g U
- R+ HIT ROCK - NO SAMPLE

#### NOTES

URANIUM (pCi/g U).  
CIMARRON GAMMA SPEC SOIL COUNTER.  
SITE SOIL BACKGROUND OF APPROX. 4.0 pCi/g U, NOT SUBTRACTED.

75 0 75

SCALE IN METERS



REV.	DESCRIPTION	DRWN BY:	CHK'D BY:	APP'D BY:	DATE
0	DRAWING ISSUED.	JE	WR	JL	11/2/98



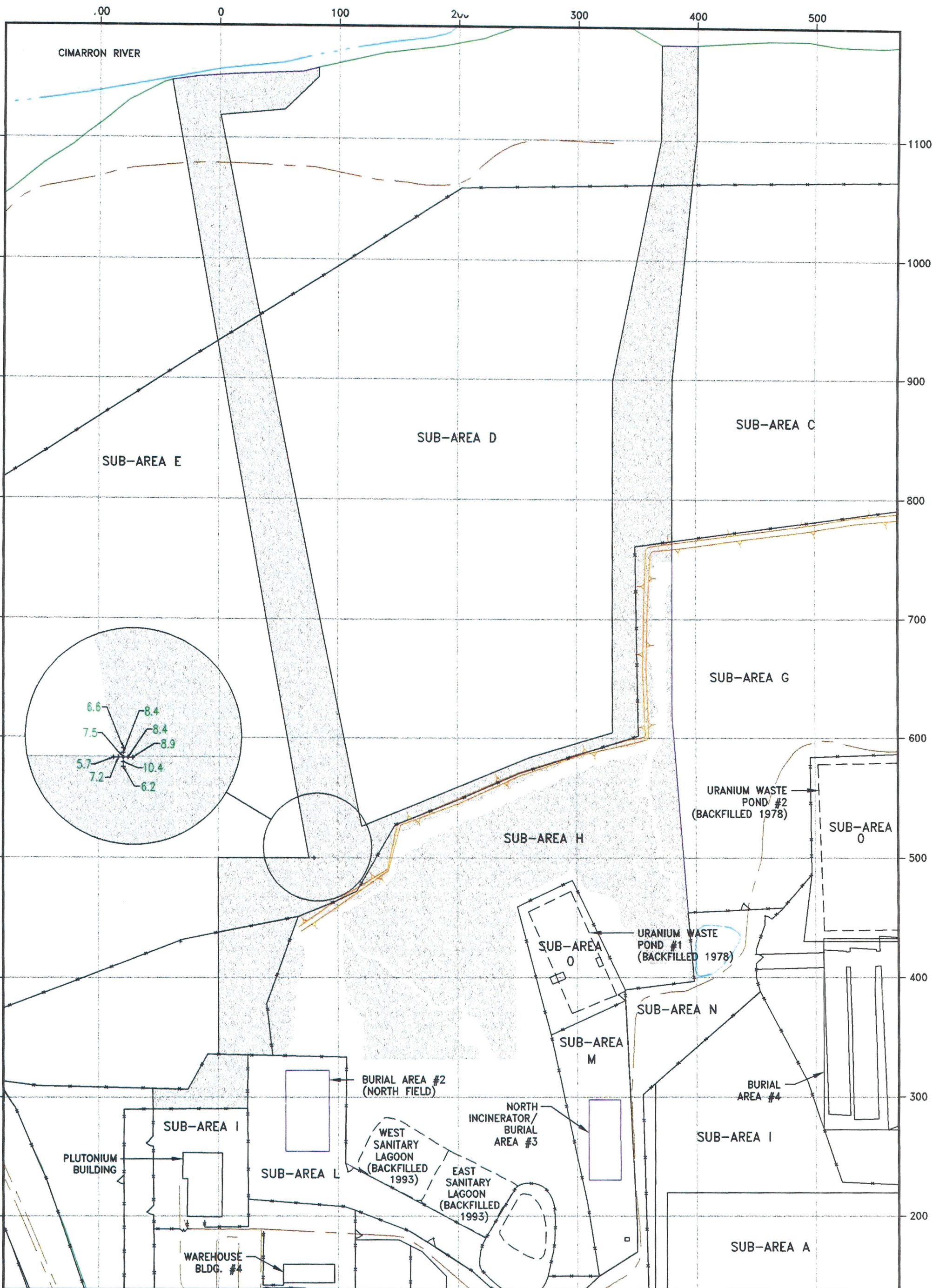
CIMARRON CORPORATION

CIMARRON FACILITY  
PHASE II - SUB-AREA H  
POST-REMEDIATION - UNAFFECTED AREA  
SOIL SAMPLE RESULTS (1998)  
SOIL SAMPLE ALIQUOT: 0-6"

DRWN. BY: JE	DATE: 8/15/98	SCALE: AS SHOWN
JOB NO.	DRAWING NO. 98POAHUASS-0	REV. 0

...\\CIMARRON\\SUBAREAH\\UNAFFECTED\_AREA\\98UNAFSS



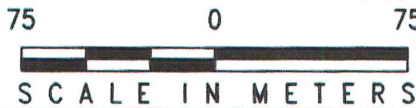


LEGEND

- 6+ URANIUM, 1 - 30 pCi/g U
- 58+ URANIUM, 31 - 100 pCi/g U
- 129+ URANIUM, 101 - 300 pCi/g U
- 327+ URANIUM, > 300 pCi/g U
- R+ HIT ROCK - NO SAMPLE

NOTES

URANIUM (pCi/g U).  
CIMARRON GAMMA SPEC SOIL COUNTER.  
SITE SOIL BACKGROUND OF APPROX. 4.0 pCi/g U, NOT SUBTRACTED.



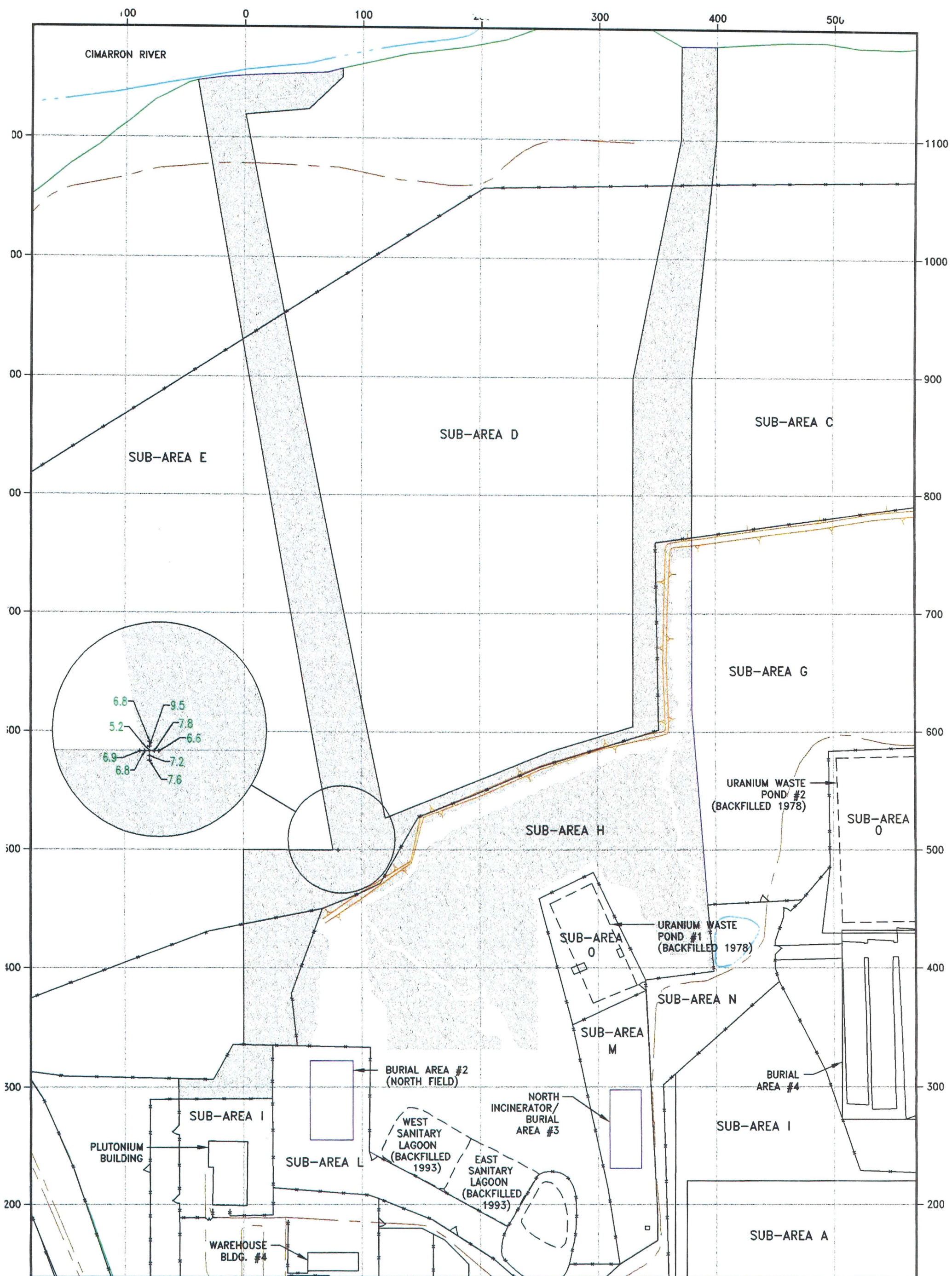
CIMARRON CORPORATION

CIMARRON FACILITY  
PHASE II - SUB-AREA H  
POST-REMEDIATION - UNAFFECTED AREA  
SOIL SAMPLE RESULTS (1998)  
SOIL SAMPLE ALIQUOT: 6"-1"

REV.	DESCRIPTION	DRWN BY:	CK'D BY:	APP'D BY:	DATE
0	DRAWING ISSUED.	JE	WR	JL	11/2/98

DRWN BY: JE	DATE: 8/15/98	SCALE: AS SHOWN
JOB NO.	DRAWING NO. 98POAHUASS-1	REV. 0



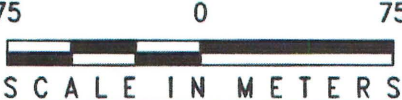


LEGEND

- 6+ URANIUM, 1 - 30 pCi/g U
- 58+ URANIUM, 31 - 100 pCi/g U
- 129+ URANIUM, 101 - 300 pCi/g U
- 327+ URANIUM, > 300 pCi/g U
- R+ HIT ROCK - NO SAMPLE

NOTES

URANIUM (pCi/g U).  
CIMARRON GAMMA SPEC SOIL COUNTER.  
SITE SOIL BACKGROUND OF APPROX. 4.0 pCi/g U, NOT SUBTRACTED.



REV.	DESCRIPTION	DRWN BY:	CK'D BY:	APP'D BY:	DATE
0	DRAWING ISSUED.	JE	WR	JL	11/2/98

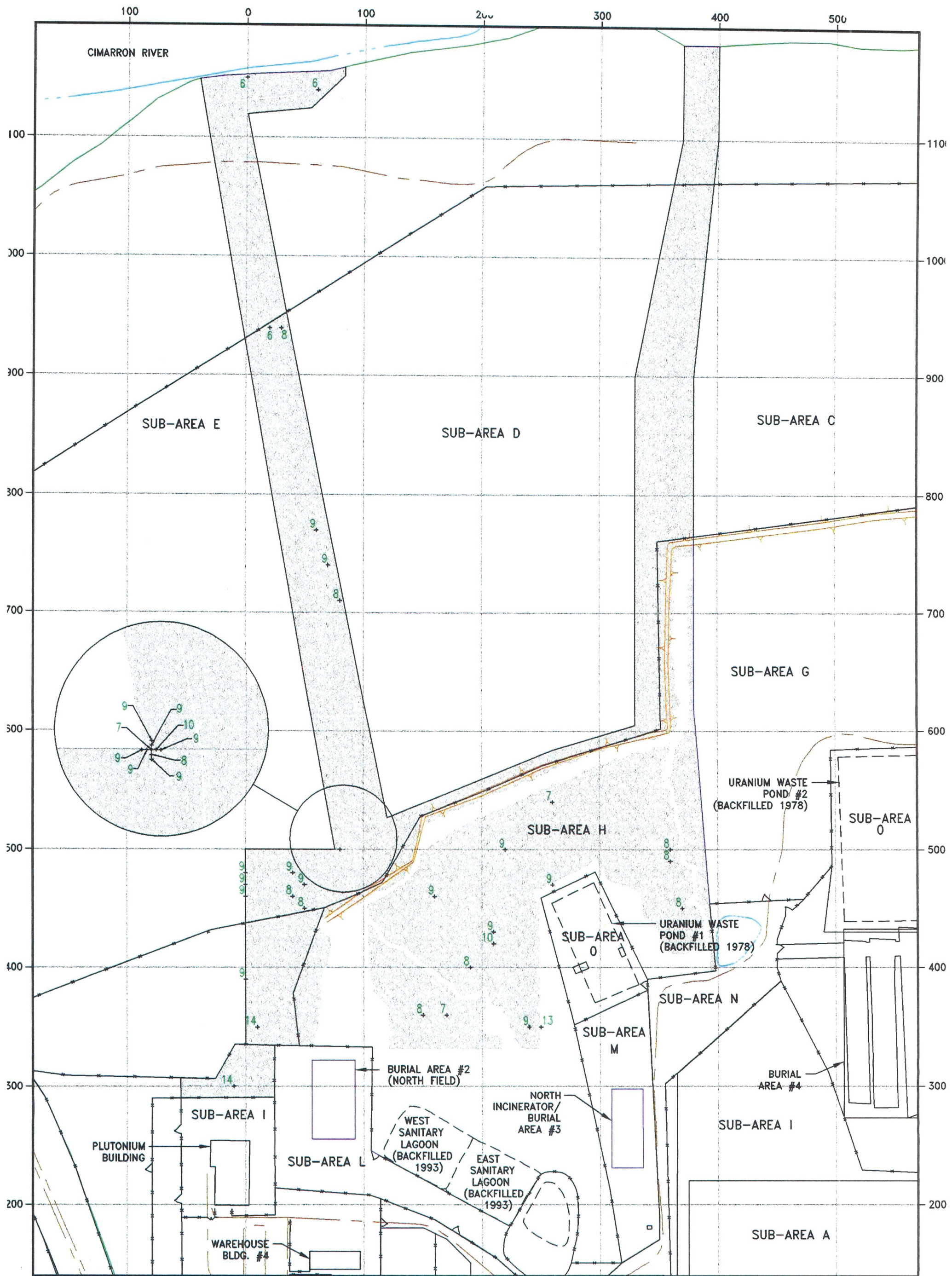


CIMARRON CORPORATION

CIMARRON FACILITY  
PHASE II - SUB-AREA H  
POST-REMEDIATION - UNAFFECTED AREA  
SOIL SAMPLE RESULTS (1998)  
SOIL SAMPLE ALIQUOT: 1'-2'

DRWN BY: JE	DATE: 8/15/98	SCALE: AS SHOWN
JOB NO.	DRAWING NO. 98POAHUASS-2	REV. 0





**NOTES**  
READINGS ARE IN MICRO-R/HR ( $\mu$ R/Hr)  
INSTRUMENT: LUDLUM MICRO-R METER  
SERIAL NO: 111299  
MODEL NO: 19  
BACKGROUND: 7  $\mu$ R/Hr.

**LEGEND**  
9+  $\leq 17 \mu$ R/Hr  
20+  $> 17 \mu$ R/Hr

75 0 75  
SCALE IN METERS

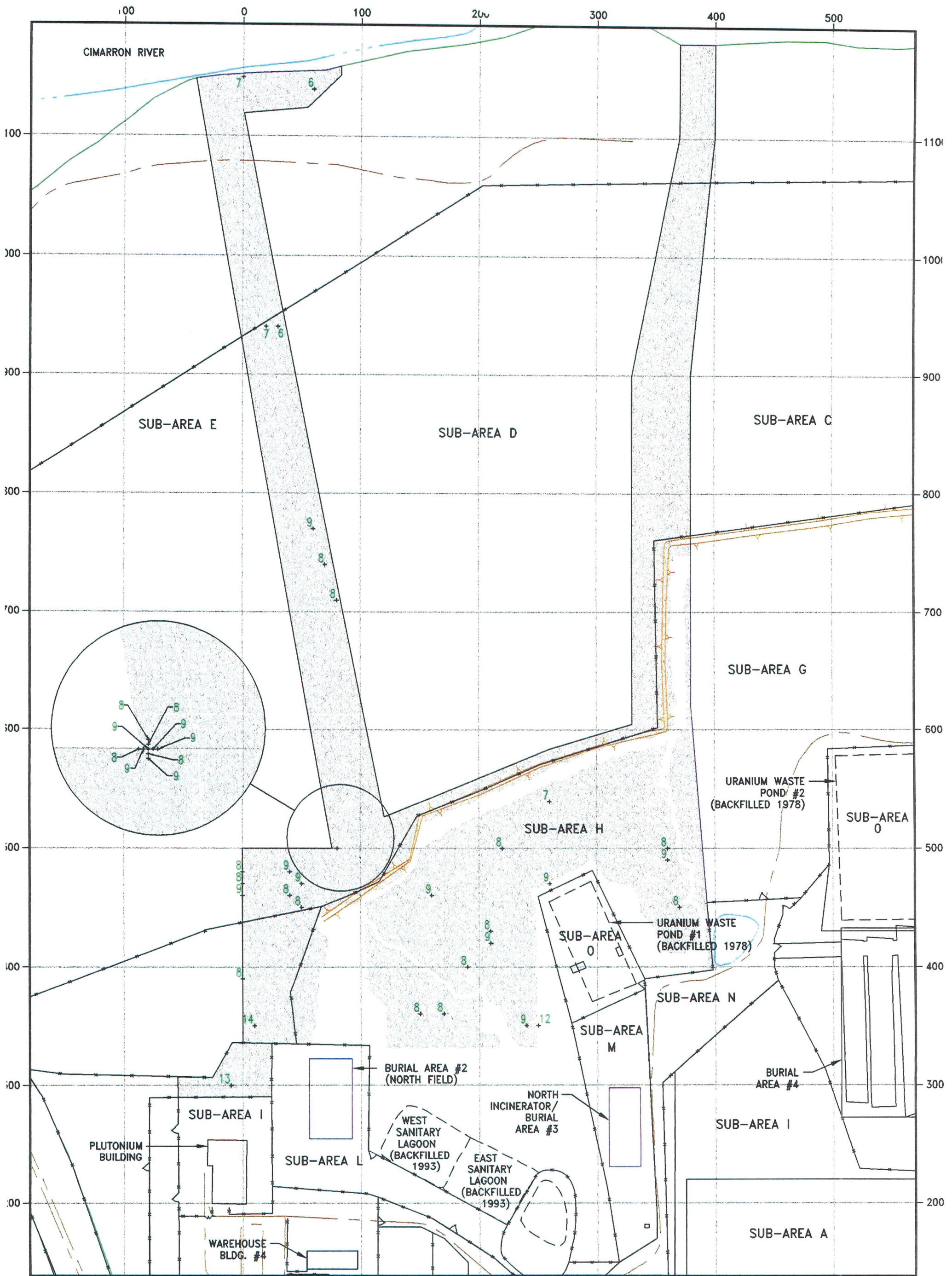
NORTH

**CIMARRON CORPORATION**

CIMARRON FACILITY  
PHASE II - SUB-AREA H  
POST-REMEDIATION - UNAFFECTED AREA  
MICRO-R SURVEY (1998)  
AT LAND SURFACE

DRWN. BY	JE	DATE	8/15/98	SCALE	AS SHOWN
JOB NO.	DRAWING NO. 98POAHUAUR-0			REV.	0






**NOTES**  
READINGS ARE IN MICRO-R/HR ( $\mu$ R/Hr)  
INSTRUMENT: LUDLUM MICRO-R METER  
SERIAL NO: 111299  
MODEL NO: 19  
BACKGROUND: 7  $\mu$ R/Hr.  
**LEGEND**  
+  $\leq 17 \mu$ R/Hr  
20+  $> 17 \mu$ R/Hr

750075

SCALE IN METERS

NORTH

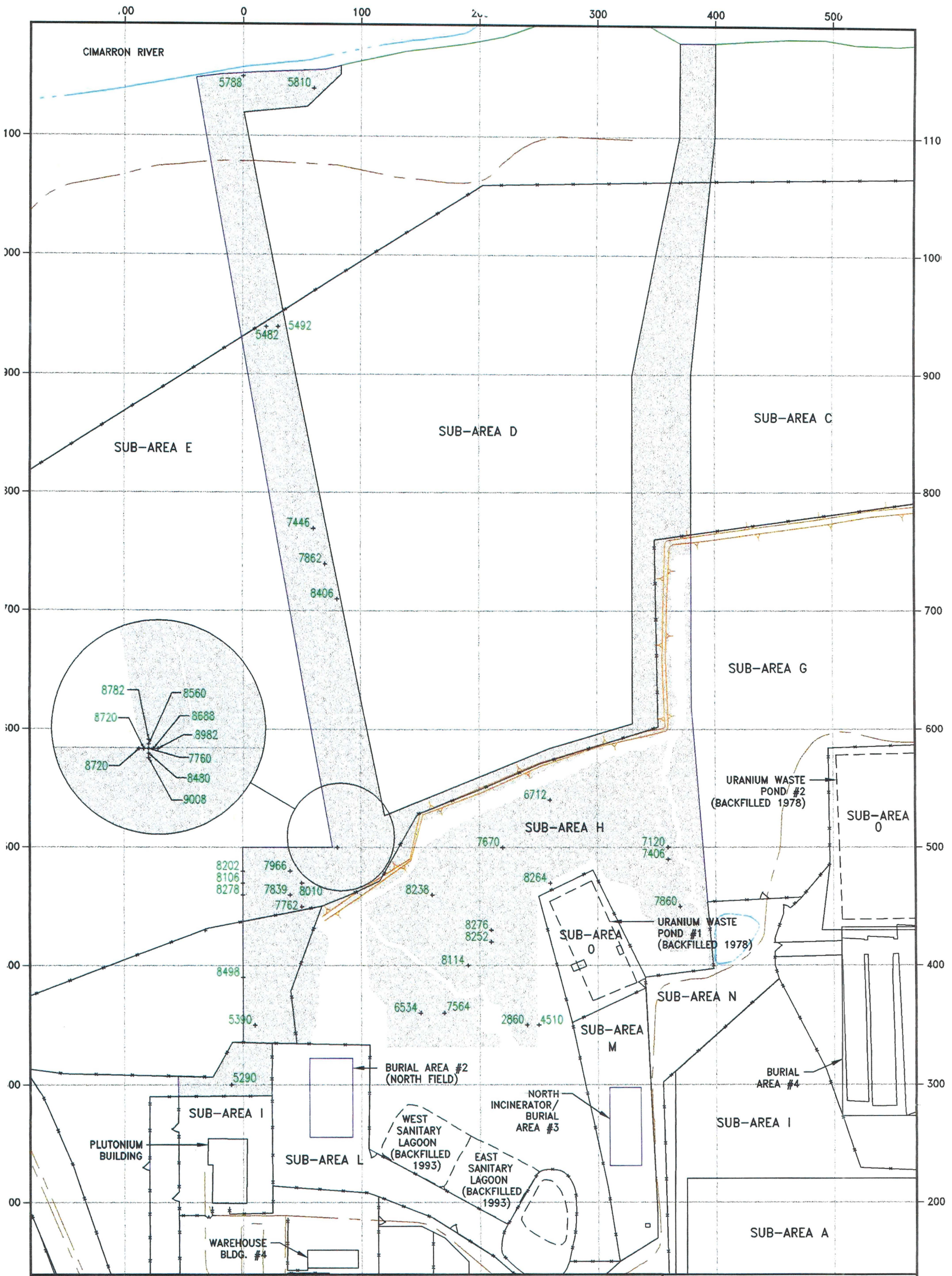
REV.	DESCRIPTION	DRWN BY:	CHK'D BY:	APP'D BY:	DATE
0	DRAWING ISSUED.	JE	WR	JL	11/2/98

 **CIMARRON CORPORATION**

**CIMARRON FACILITY  
PHASE II - SUB-AREA H  
POST-REMEDIATION - UNAFFECTED AREA  
MICRO-R SURVEY (1998)  
AT ONE METER ABOVE SURFACE**

DRWN. BY: JE	DATE: 8/15/98	SCALE: AS SHOWN
JOB NO.	DRAWING NO. 98POAHUAUR-1	REV. 0





**NOTES:**

INSTRUMENT: LUDLUM 2221, S/N 97264, LEAD-UNSHIELDED 3" X 1/2" NaI DETECTOR.

BACKGROUND: 7670 CPM

INSTRUMENT: LUDLUM 2220, S/N 48395, LEAD-SHIELDED 3" X 1/2" NaI DETECTOR.

BACKGROUND: 2800 CPM

**LEGEND**

3560 < 15340 CPM

16350 > 15340 CPM

75 0 75

SCALE IN METERS

REV.	DESCRIPTION	DRWN BY:	CK'D BY:	APP'D BY:	DATE
0	DRAWING ISSUED.	JE	WR	JL	11/2/98

**CIMARRON CORPORATION**

CIMARRON FACILITY  
PHASE II - SUB-AREA H  
POST-REMEDATION - UNAFFECTED AREA  
GAMMA SURVEY (1998)  
READINGS IN CPM (3" DET.) AT SURFACE

DRWN. BY	DATE	SCALE
JE	8/12/98	AS SHOWN

JOB NO.	DRAWING NO.	REV.
	98POAHUA3D-0	0



***SUB AREA "H"*    CONCRETE**

**RESRAD, Version 5.70**

**Inhalation Scenario**

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Dose Conversion Factor (and Related) Parameter Summary  
File: DOSFAC30.BIN

Menu	Parameter	Current Value	Default	Parameter Name
B-1	Dose conversion factors for inhalation, mrem/pCi:			
B-1	Ac-227+D	6.720E+00	6.720E+00	DCF2( 1)
B-1	Pa-231	1.280E+00	1.280E+00	DCF2( 2)
B-1	Pb-210+D	1.380E-02	1.380E-02	DCF2( 3)
B-1	Po-210	9.400E-03	9.400E-03	DCF2( 4)
B-1	Ra-226+D	8.600E-03	8.600E-03	DCF2( 5)
B-1	Th-230	3.260E-01	3.260E-01	DCF2( 6)
B-1	U-234	1.320E-01	1.320E-01	DCF2( 7)
B-1	U-235+D	1.230E-01	1.230E-01	DCF2( 8)
B-1	U-238+D	1.180E-01	1.180E-01	DCF2( 9)
D-1	Dose conversion factors for ingestion, mrem/pCi:			
D-1	Ac-227+D	1.480E-02	1.480E-02	DCF3( 1)
D-1	Pa-231	1.060E-02	1.060E-02	DCF3( 2)
D-1	Pb-210+D	5.370E-03	5.370E-03	DCF3( 3)
D-1	Po-210	1.900E-03	1.900E-03	DCF3( 4)
D-1	Ra-226+D	1.330E-03	1.330E-03	DCF3( 5)
D-1	Th-230	5.480E-04	5.480E-04	DCF3( 6)
D-1	U-234	2.830E-04	2.830E-04	DCF3( 7)
D-1	U-235+D	2.670E-04	2.670E-04	DCF3( 8)
D-1	U-238+D	2.690E-04	2.690E-04	DCF3( 9)
D-34	Food transfer factors:			
D-34	Ac-227+D , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF( 1,1)
D-34	Ac-227+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	2.000E-05	2.000E-05	RTF( 1,2)
D-34	Ac-227+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.000E-05	2.000E-05	RTF( 1,3)
D-34	Pa-231 , plant/soil concentration ratio, dimensionless	1.000E-02	1.000E-02	RTF( 2,1)
D-34	Pa-231 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	5.000E-03	5.000E-03	RTF( 2,2)
D-34	Pa-231 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF( 2,3)
D-34	Pb-210+D , plant/soil concentration ratio, dimensionless	1.000E-02	1.000E-02	RTF( 3,1)
D-34	Pb-210+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	8.000E-04	8.000E-04	RTF( 3,2)
D-34	Pb-210+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	3.000E-04	3.000E-04	RTF( 3,3)
D-34	Po-210 , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF( 4,1)
D-34	Po-210 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	5.000E-03	5.000E-03	RTF( 4,2)
D-34	Po-210 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	3.400E-04	3.400E-04	RTF( 4,3)
D-34	Ra-226+D , plant/soil concentration ratio, dimensionless	4.000E-02	4.000E-02	RTF( 5,1)
D-34	Ra-226+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-03	1.000E-03	RTF( 5,2)
D-34	Ra-226+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-03	1.000E-03	RTF( 5,3)
D-34	Th-230 , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF( 6,1)
D-34	Th-230 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF( 6,2)
D-34	Th-230 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF( 6,3)
D-34	U-234 , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF( 7,1)
D-34	U-234 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF( 7,2)
D-34	U-234 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF( 7,3)

Dose Conversion Factor (and Related) Parameter Summary (continued)  
 File: DOSFAC30.BIN

Menu	Parameter	Current Value	Default	Parameter Name
D-34	U-235+D , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF( 8,1)
D-34	U-235+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF( 8,2)
D-34	U-235+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF( 8,3)
D-34	U-238+D , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF( 9,1)
D-34	U-238+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF( 9,2)
D-34	U-238+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF( 9,3)
D-5	Bioaccumulation factors, fresh water, L/kg:			
D-5	Ac-227+D , fish	1.500E+01	1.500E+01	BIOFAC( 1,1)
D-5	Ac-227+D , crustacea and mollusks	1.000E+03	1.000E+03	BIOFAC( 1,2)
D-5	Pa-231 , fish	1.000E+01	1.000E+01	BIOFAC( 2,1)
D-5	Pa-231 , crustacea and mollusks	1.100E+02	1.100E+02	BIOFAC( 2,2)
D-5	Pb-210+D , fish	3.000E+02	3.000E+02	BIOFAC( 3,1)
D-5	Pb-210+D , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC( 3,2)
D-5	Po-210 , fish	1.000E+02	1.000E+02	BIOFAC( 4,1)
D-5	Po-210 , crustacea and mollusks	2.000E+04	2.000E+04	BIOFAC( 4,2)
D-5	Ra-226+D , fish	5.000E+01	5.000E+01	BIOFAC( 5,1)
D-5	Ra-226+D , crustacea and mollusks	2.500E+02	2.500E+02	BIOFAC( 5,2)
D-5	Th-230 , fish	1.000E+02	1.000E+02	BIOFAC( 6,1)
D-5	Th-230 , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC( 6,2)
D-5	U-234 , fish	1.000E+01	1.000E+01	BIOFAC( 7,1)
D-5	U-234 , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC( 7,2)
D-5	U-235+D , fish	1.000E+01	1.000E+01	BIOFAC( 8,1)
D-5	U-235+D , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC( 8,2)
D-5	U-238+D , fish	1.000E+01	1.000E+01	BIOFAC( 9,1)
D-5	U-238+D , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC( 9,2)

Site-Specific Parameter Summary

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R011	Area of contaminated zone (m**2)	1.110E+02	1.000E+04	---	AREA
R011	Thickness of contaminated zone (m)	1.524E-01	2.000E+00	---	THICK0
R011	Length parallel to aquifer flow (m)	not used	1.000E+02	---	LCZPAQ
R011	Basic radiation dose limit (mrem/yr)	3.000E+01	3.000E+01	---	BRDL
R011	Time since placement of material (yr)	2.000E+01	0.000E+00	---	TI
R011	Times for calculations (yr)	1.000E+00	1.000E+00	---	T( 2)
R011	Times for calculations (yr)	3.000E+00	3.000E+00	---	T( 3)
R011	Times for calculations (yr)	1.000E+01	1.000E+01	---	T( 4)
R011	Times for calculations (yr)	3.000E+01	3.000E+01	---	T( 5)
R011	Times for calculations (yr)	1.000E+02	1.000E+02	---	T( 6)
R011	Times for calculations (yr)	3.000E+02	3.000E+02	---	T( 7)
R011	Times for calculations (yr)	5.000E+02	1.000E+03	---	T( 8)
R011	Times for calculations (yr)	9.000E+02	0.000E+00	---	T( 9)
R011	Times for calculations (yr)	1.000E+03	0.000E+00	---	T(10)
R012	Initial principal radionuclide (pCi/g): U-234	5.690E+00	0.000E+00	---	S1( 7)
R012	Initial principal radionuclide (pCi/g): U-235	1.200E-01	0.000E+00	---	S1( 8)
R012	Initial principal radionuclide (pCi/g): U-238	1.440E+00	0.000E+00	---	S1( 9)
R012	Concentration in groundwater (pCi/L): U-234	not used	0.000E+00	---	W1( 7)
R012	Concentration in groundwater (pCi/L): U-235	not used	0.000E+00	---	W1( 8)
R012	Concentration in groundwater (pCi/L): U-238	not used	0.000E+00	---	W1( 9)
R013	Cover depth (m)	0.000E+00	0.000E+00	---	COVER0
R013	Density of cover material (g/cm**3)	not used	1.500E+00	---	DENSCV
R013	Cover depth erosion rate (m/yr)	not used	1.000E-03	---	VCV
R013	Density of contaminated zone (g/cm**3)	1.800E+00	1.500E+00	---	DENSCZ
R013	Contaminated zone erosion rate (m/yr)	6.700E-05	1.000E-03	---	VCZ
R013	Contaminated zone total porosity	3.000E-01	4.000E-01	---	TPCZ
R013	Contaminated zone effective porosity	2.000E-01	2.000E-01	---	EPCZ
R013	Contaminated zone hydraulic conductivity (m/yr)	1.000E+01	1.000E+01	---	HCCZ
R013	Contaminated zone b parameter	5.300E+00	5.300E+00	---	BCZ
R013	Humidity in air (g/cm**3)	not used	8.000E+00	---	HUMID
R013	Evapotranspiration coefficient	5.000E-01	5.000E-01	---	EVAPTR
R013	Precipitation (m/yr)	1.000E+00	1.000E+00	---	PRECIP
R013	Irrigation (m/yr)	7.600E-01	2.000E-01	---	RI
R013	Irrigation mode	overhead	overhead	---	IDITCH
R013	Runoff coefficient	2.000E-01	2.000E-01	---	RUNOFF
R013	Watershed area for nearby stream or pond (m**2)	not used	1.000E+06	---	WAREA
R013	Accuracy for water/soil computations	not used	1.000E-03	---	EPS
R014	Density of saturated zone (g/cm**3)	not used	1.500E+00	---	DENSAQ
R014	Saturated zone total porosity	not used	4.000E-01	---	TPSZ
R014	Saturated zone effective porosity	not used	2.000E-01	---	EPSZ
R014	Saturated zone hydraulic conductivity (m/yr)	not used	1.000E+02	---	HCSZ
R014	Saturated zone hydraulic gradient	not used	2.000E-02	---	HGWT
R014	Saturated zone b parameter	not used	5.300E+00	---	BSZ
R014	Water table drop rate (m/yr)	not used	1.000E-03	---	VWT
R014	Well pump intake depth (m below water table)	not used	1.000E+01	---	DWIBWT
R014	Model: Nondispersion (ND) or Mass-Balance (MB)	not used	ND	---	MODEL
R014	Well pumping rate (m**3/yr)	not used	2.500E+02	---	UW



Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R015	Number of unsaturated zone strata	not used	1	---	NS
R015	Unsat. zone 1, thickness (m)	not used	4.000E+00	---	H(1)
R015	Unsat. zone 1, soil density (g/cm**3)	not used	1.500E+00	---	DENSUZ(1)
R015	Unsat. zone 1, total porosity	not used	4.000E-01	---	TPUZ(1)
R015	Unsat. zone 1, effective porosity	not used	2.000E-01	---	EPUZ(1)
R015	Unsat. zone 1, soil-specific b parameter	not used	5.300E+00	---	BUZ(1)
R015	Unsat. zone 1, hydraulic conductivity (m/yr)	not used	1.000E+01	---	HCUZ(1)
R016	Distribution coefficients for U-234				
R016	Contaminated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCC( 7)
R016	Unsat. zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU( 7,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS( 7)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	5.671E-02	ALEACH( 7)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK( 7)
R016	Distribution coefficients for U-235				
R016	Contaminated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCC( 8)
R016	Unsat. zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU( 8,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS( 8)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	5.671E-02	ALEACH( 8)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK( 8)
R016	Distribution coefficients for U-238				
R016	Contaminated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCC( 9)
R016	Unsat. zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU( 9,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS( 9)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	5.671E-02	ALEACH( 9)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK( 9)
R016	Distribution coefficients for daughter Ac-227				
R016	Contaminated zone (cm**3/g)	2.000E+01	2.000E+01	---	DCNUCC( 1)
R016	Unsat. zone 1 (cm**3/g)	not used	2.000E+01	---	DCNUCU( 1,1)
R016	Saturated zone (cm**3/g)	not used	2.000E+01	---	DCNUCS( 1)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.412E-01	ALEACH( 1)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK( 1)
R016	Distribution coefficients for daughter Pa-231				
R016	Contaminated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCC( 2)
R016	Unsat. zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU( 2,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS( 2)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	5.671E-02	ALEACH( 2)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK( 2)
R016	Distribution coefficients for daughter Pb-210				
R016	Contaminated zone (cm**3/g)	1.000E+02	1.000E+02	---	DCNUCC( 3)
R016	Unsat. zone 1 (cm**3/g)	not used	1.000E+02	---	DCNUCU( 3,1)
R016	Saturated zone (cm**3/g)	not used	1.000E+02	---	DCNUCS( 3)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.839E-02	ALEACH( 3)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK( 3)

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R016	Distribution coefficients for daughter Po-210				
R016	Contaminated zone (cm**3/g)	1.000E+01	1.000E+01	---	DCNUCC( 4)
R016	Unsaturated zone 1 (cm**3/g)	not used	1.000E+01	---	DCNUCU( 4,1)
R016	Saturated zone (cm**3/g)	not used	1.000E+01	---	DCNUCS( 4)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.805E-01	ALEACH( 4)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK( 4)
R016	Distribution coefficients for daughter Ra-226				
R016	Contaminated zone (cm**3/g)	7.000E+01	7.000E+01	---	DCNUCC( 5)
R016	Unsaturated zone 1 (cm**3/g)	not used	7.000E+01	---	DCNUCU( 5,1)
R016	Saturated zone (cm**3/g)	not used	7.000E+01	---	DCNUCS( 5)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	4.054E-02	ALEACH( 5)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK( 5)
R016	Distribution coefficients for daughter Th-230				
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC( 6)
R016	Unsaturated zone 1 (cm**3/g)	not used	6.000E+04	---	DCNUCU( 6,1)
R016	Saturated zone (cm**3/g)	not used	6.000E+04	---	DCNUCS( 6)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	4.739E-05	ALEACH( 6)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK( 6)
R017	Inhalation rate (m**3/yr)	1.051E+04	8.400E+03	---	INHALR
R017	Mass loading for inhalation (g/m**3)	2.000E-04	2.000E-04	---	MLINH
R017	Dilution length for airborne dust, inhalation (m)	3.000E+00	3.000E+00	---	LM
R017	Exposure duration	5.000E+01	3.000E+01	---	ED
R017	Shielding factor, inhalation	5.000E-01	4.000E-01	---	SHF3
R017	Shielding factor, external gamma	not used	7.000E-01	---	SHF1
R017	Fraction of time spent indoors	5.500E-01	5.000E-01	---	FIND
R017	Fraction of time spent outdoors (on site)	2.100E-01	2.500E-01	---	FOTD
R017	Shape factor flag, external gamma	not used	1.000E+00	1 shows circular AREA.	FS
R017	Radii of shape factor array (used if FS = -1):				
R017	Outer annular radius (m), ring 1:	not used	5.000E+01	---	RAD SHAPE( 1)
R017	Outer annular radius (m), ring 2:	not used	7.071E+01	---	RAD SHAPE( 2)
R017	Outer annular radius (m), ring 3:	not used	0.000E+00	---	RAD SHAPE( 3)
R017	Outer annular radius (m), ring 4:	not used	0.000E+00	---	RAD SHAPE( 4)
R017	Outer annular radius (m), ring 5:	not used	0.000E+00	---	RAD SHAPE( 5)
R017	Outer annular radius (m), ring 6:	not used	0.000E+00	---	RAD SHAPE( 6)
R017	Outer annular radius (m), ring 7:	not used	0.000E+00	---	RAD SHAPE( 7)
R017	Outer annular radius (m), ring 8:	not used	0.000E+00	---	RAD SHAPE( 8)
R017	Outer annular radius (m), ring 9:	not used	0.000E+00	---	RAD SHAPE( 9)
R017	Outer annular radius (m), ring 10:	not used	0.000E+00	---	RAD SHAPE(10)
R017	Outer annular radius (m), ring 11:	not used	0.000E+00	---	RAD SHAPE(11)
R017	Outer annular radius (m), ring 12:	not used	0.000E+00	---	RAD SHAPE(12)

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R017	Fractions of annular areas within AREA:				
R017	Ring 1	not used	1.000E+00	---	FRACA( 1)
R017	Ring 2	not used	2.732E-01	---	FRACA( 2)
R017	Ring 3	not used	0.000E+00	---	FRACA( 3)
R017	Ring 4	not used	0.000E+00	---	FRACA( 4)
R017	Ring 5	not used	0.000E+00	---	FRACA( 5)
R017	Ring 6	not used	0.000E+00	---	FRACA( 6)
R017	Ring 7	not used	0.000E+00	---	FRACA( 7)
R017	Ring 8	not used	0.000E+00	---	FRACA( 8)
R017	Ring 9	not used	0.000E+00	---	FRACA( 9)
R017	Ring 10	not used	0.000E+00	---	FRACA(10)
R017	Ring 11	not used	0.000E+00	---	FRACA(11)
R017	Ring 12	not used	0.000E+00	---	FRACA(12)
R018	Fruits, vegetables and grain consumption (kg/yr)	not used	1.600E+02	---	DIET(1)
R018	Leafy vegetable consumption (kg/yr)	not used	1.400E+01	---	DIET(2)
R018	Milk consumption (L/yr)	not used	9.200E+01	---	DIET(3)
R018	Meat and poultry consumption (kg/yr)	not used	6.300E+01	---	DIET(4)
R018	Fish consumption (kg/yr)	not used	5.400E+00	---	DIET(5)
R018	Other seafood consumption (kg/yr)	not used	9.000E-01	---	DIET(6)
R018	Soil ingestion rate (g/yr)	not used	3.650E+01	---	SOIL
R018	Drinking water intake (L/yr)	not used	5.100E+02	---	DWI
R018	Contamination fraction of drinking water	not used	1.000E+00	---	FDW
R018	Contamination fraction of household water	not used	1.000E+00	---	FHHW
R018	Contamination fraction of livestock water	not used	1.000E+00	---	FLW
R018	Contamination fraction of irrigation water	not used	1.000E+00	---	FIRW
R018	Contamination fraction of aquatic food	not used	5.000E-01	---	FR9
R018	Contamination fraction of plant food	not used	-1	---	FPLANT
R018	Contamination fraction of meat	not used	-1	---	FMEAT
R018	Contamination fraction of milk	not used	-1	---	FMILK
R019	Livestock fodder intake for meat (kg/day)	not used	6.800E+01	---	LF15
R019	Livestock fodder intake for milk (kg/day)	not used	5.500E+01	---	LF16
R019	Livestock water intake for meat (L/day)	not used	5.000E+01	---	LWI5
R019	Livestock water intake for milk (L/day)	not used	1.600E+02	---	LWI6
R019	Livestock soil intake (kg/day)	not used	5.000E-01	---	LSI
R019	Mass loading for foliar deposition (g/m**3)	not used	1.000E-04	---	MLFD
R019	Depth of soil mixing layer (m)	1.500E-01	1.500E-01	---	DM
R019	Depth of roots (m)	not used	9.000E-01	---	DROOT
R019	Drinking water fraction from ground water	1.000E+00	1.000E+00	---	EGWDW
R019	Household water fraction from ground water	not used	1.000E+00	---	EGWHH
R019	Livestock water fraction from ground water	not used	1.000E+00	---	EGWLW
R019	Irrigation fraction from ground water	not used	1.000E+00	---	EGWIR
C14	C-12 concentration in water (g/cm**3)	not used	2.000E-05	---	C12WTR
C14	C-12 concentration in contaminated soil (g/g)	not used	3.000E-02	---	C12CZ
C14	Fraction of vegetation carbon from soil	not used	2.000E-02	---	CSOIL
C14	Fraction of vegetation carbon from air	not used	9.800E-01	---	CAIR
C14	C-14 evasion layer thickness in soil (m)	not used	3.000E-01	---	DMC
C14	C-14 evasion flux rate from soil (l/sec)	not used	7.000E-07	---	EVSN
C14	C-12 evasion flux rate from soil (l/sec)	not used	1.000E-10	---	REVSN



Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
C14	Fraction of grain in beef cattle feed	not used	8.000E-01	---	AVFG4
C14	Fraction of grain in milk cow feed	not used	2.000E-01	---	AVFG5
STOR	Storage times of contaminated foodstuffs (days):				
STOR	Fruits, non-leafy vegetables, and grain	not used	1.400E+01	---	STOR T(1)
STOR	Leafy vegetables	not used	1.000E+00	---	STOR T(2)
STOR	Milk	not used	1.000E+00	---	STOR T(3)
STOR	Meat and poultry	not used	2.000E+01	---	STOR T(4)
STOR	Fish	not used	7.000E+00	---	STOR T(5)
STOR	Crustacea and mollusks	not used	7.000E+00	---	STOR T(6)
STOR	Well water	not used	1.000E+00	---	STOR T(7)
STOR	Surface water	not used	1.000E+00	---	STOR T(8)
STOR	Livestock fodder	not used	4.500E+01	---	STOR T(9)
R021	Thickness of building foundation (m)	not used	1.500E-01	---	FLOOR
R021	Bulk density of building foundation (g/cm <sup>3</sup> )	not used	2.400E+00	---	DENSEL
R021	Total porosity of the cover material	not used	4.000E-01	---	TPCV
R021	Total porosity of the building foundation	not used	1.000E-01	---	TPFL
R021	Volumetric water content of the cover material	not used	5.000E-02	---	PH2OCV
R021	Volumetric water content of the foundation	not used	3.000E-02	---	PH2OFL
R021	Diffusion coefficient for radon gas (m/sec):				
R021	in cover material	not used	2.000E-06	---	DIFCV
R021	in foundation material	not used	3.000E-07	---	DIFFL
R021	in contaminated zone soil	not used	2.000E-06	---	DIFCZ
R021	Radon vertical dimension of mixing (m)	not used	2.000E+00	---	HMIX
R021	Average annual wind speed (m/sec)	not used	2.000E+00	---	WIND
R021	Average building air exchange rate (1/hr)	not used	5.000E-01	---	REXG
R021	Height of the building (room) (m)	not used	2.500E+00	---	HRM
R021	Building interior area factor	not used	0.000E+00	---	FAI
R021	Building depth below ground surface (m)	not used	-1.000E+00	---	DMFL
R021	Emanating power of Rn-222 gas	not used	2.500E-01	---	EMANA(1)
R021	Emanating power of Rn-220 gas	not used	1.500E-01	---	EMANA(2)

Summary of Pathway Selections

Pathway	User Selection
1 -- external gamma	suppressed
2 -- inhalation (w/o radon)	active
3 -- plant ingestion	suppressed
4 -- meat ingestion	suppressed
5 -- milk ingestion	suppressed
6 -- aquatic foods	suppressed
7 -- drinking water	suppressed
8 -- soil ingestion	suppressed
9 -- radon	suppressed

RESRAD, Version 5.70 T<sub>1/2</sub> Limit = 30 days  
 Summary : PG-8-08 Default Parameters

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Contaminated Zone Dimensions		Initial Soil Concentrations, pCi/g	
Area:	111.00 square meters	U-234	5.690E+00
Thickness:	0.15 meters	U-235	1.200E-01
Cover Depth:	0.00 meters	U-238	1.440E+00

Total Dose TDOSE(t), mrem/yr  
 Basic Radiation Dose Limit = 30 mrem/yr  
 Total Mixture Sum M(t) = Fraction of Basic Dose Limit Received at Time (t)

t (years):	0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	5.000E+02	9.000E+02	1.000E+03
TDOSE(t):	7.425E-01	7.016E-01	6.264E-01	4.213E-01	1.357E-01	2.711E-03	2.030E-04	1.803E-04	1.366E-04	1.259E-04
M(t):	2.475E-02	2.339E-02	2.088E-02	1.404E-02	4.523E-03	9.036E-05	6.766E-06	6.011E-06	4.553E-06	4.198E-06

Maximum TDOSE(t): 7.425E-01 mrem/yr at t = 0.000E+00 years